NRCS
Natural Resources
Conservation Service

AWM
User Guide

January 13, 2003

Acknowledgements

Animal Waste Management (AWM) is a tool developed by Natural Resources Conservation Service (NRCS) for its employees and others to use in planning and sizing of structural components for agricultural waste management systems. The program results from a team effort with leadership provided by the NRCS National Water and Climate Center. AWM is a complete revision of a 1995 DOS program with the same name that was developed by Clint W. Liezert, Civil Engineering Specialist, NRCS, Medina, Ohio (now retired). The AWM development team members included:

- William H. Boyd, Environmental Engineer, NRCS, National Water Management Center, Little Rock, AR
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- Stephen Henry, Environmental Engineer, NRCS, Columbia, SC
- Chance Lerro, Programmer Analyst, Anteon, Portland, OR
- David C. Moffitt, Environmental Engineer, NRCS, National Water Management Center, Fort Worth, TX
- Bruce Newton, Water Quality Team Leader - Limnologist, NRCS, National Water and Climate Center, Portland, OR
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- Rick Roberson, Information Systems Team Leader, NRCS, National Water and Climate Center, Portland, OR
- Donald L. Stettler, Environmental Engineer, NRCS, National Water and Climate Center, Portland, OR
- Jodie Stringer, Urban Engineer, NRCS, Tulsa, OK
- Denise Watkins, Supervisory Civil Engineer, NRCS, Chattanooga, TN
- Bruce Wilson, Environmental Engineer, NRCS, National Water and Climate Center, Portland, OR

Anteon Corporation provided contract computer programming services under the leadership of James Dana, Portland, OR. Dipesh Patel, computer programmer, Portland, OR, wrote the code for AWM.

Special thanks to Vantha Sok-Cham for developing the scgrid component used throughout AWM.

Table of Contents

Chapter 1 – Overview of AWM

What AWM Does

AWM is a planning/design tool for animal feeding operations that can be used to estimate the production of manure, bedding, process water and determine the size of storage/treatment facilities. The procedures and calculations used in AWM are based on the USDA-NRCS Agricultural Waste Management Field Handbook.

AWM uses the concepts of "Manure Master" to produce a gross nutrient balance but does not track mass or concentration of nutrients for determining land application rates or for other utilization components.

Features of AWM

- Provides manure characteristics for eight animal types with the ability to modify these characteristics and add animal types as necessary.
- Accounts for bedding, wastewater, flush water and other additions to the waste stream.
- Tracks liquid and solid wastes produced in multiple locations through multiple waste streams.
- Develops separation, storage, and treatment components for liquid and solid wastes that are defined as "Management Trains"..
- Estimate precipitation and runoff entering the "Management Train"..
- Sizes storage facilities using a defined storage period or drawdown dates specified by the user.
- Develops a monthly water and waste budget for each treatment/storage component.
- Provides a calculator for converting units and performing computations.
- Produces a gross nutrient balance from target yields and crop acreage specified for crops listed in the crop database.
- Provides a schematic drawing for each treatment/storage component.
- Generates a standard or custom report to document the system design.

User Support

User support can be obtained from USDA-NRCS National Water and Climate Center or the National Water Management Center. Contact either Bruce Wilson at (503) 414-3076/ bwilson@wcc.nrcs.usda.gov, William Boyd at (501)210-8917/ William.Boyd@ar.usda.gov or Dave Moffit at (817) 509-3315/ dmoffitt@ftw.nrcs.usda.gov.

Future Enhancements

USDA-NRCS solicits the input of users to help determine thpe priority of potential enhancements to AWM. Please contact user support to let us know what enhancements would be of value to you.

Chapter 2 – Installing and Starting AWM

What You Need to Use AWM

System requirements:

- Any IBM-compatible machine with an 80286 processor or higher.
- Windows 95/98/NT
- At least 32 megabytes of memory
- At least 35 megabytes of hard drive storage space

Installation on CCE and Non-CCE Machines

AWM may be installed on both USDA Common Computing Environment (CCE) machines and non-CCE machines. The AWM installation program will detect whether your machine is a CCE machine and make necessary adjustments to the installation process. System administrator privileges will be needed to install AWM on CCE a machine.

Installing AWM

AWM is available from the NRCS National Water and Climate Center

1. Download the following files from the USDA-NRCS National Water and Climate Center, Water Quality and Quantity Sciences, Animal Waste Management webpage; http://www.wcc.nrcs.usda.gov/water/quality/common/wastemgmt/awm.html to a temporary directory on your computer's hard drive:

   - The AWM installation program, AWM202_INST.exe
   - State database file for user's State (or for multiple States)
   - AWM User Guide in either Portable Document Format (PDF) or Microsoft Word.™

2. Execute the downloaded installation program by either:
   - Double clicking on AWM202_INST.exe in Windows Explorer, or
   - Clicking **Start**, select **Run**, browse to the file location, select AWM202_INST.exe, and press run.

3. Move the state database file(s) and User Guide to the directory where AWM files reside, which is usually in C:\Program Files\usda\AWM 2.0 directory.

Starting AWM

AWM may be started in a variety of manners depending on the type of machine and whether the USDA Customer Service Toolkit is installed.

Any Computer

Click the Start button, select Programs, select Engineering Applications, and then select AWM. This will open the program without opening any saved client files.

From Windows Explorer

A previously saved design file may be used to open AWM. From within Windows Explorer, locate and double-click on a previously saved design file. These files will have the extension *awm* (e.g., *Elmer_Farms.awm*)

From the Customer Service Toolkit Client List

Within the USDA Customer Service Toolkit you can browse the client list in Outlook and determine if the client files include any AWM design files. These will be identifiable by the *.awm* extension. Clicking on these files will open AWM with the previously saved design file.

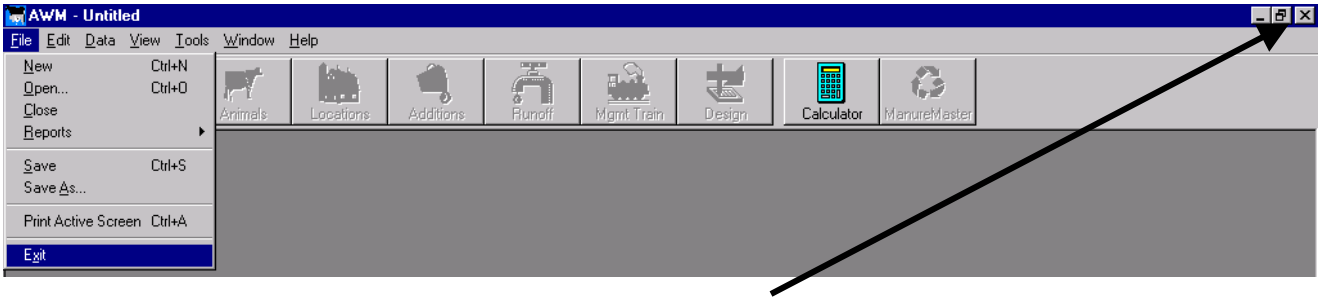
From the Customer Service Toolkit

Anytime you are working within Customer Service Toolkit on a client you may click on Tools in the menu bar, click on Engineering Tools, and select AWM. AWM will open with the client's name automatically entered. Upon exiting AWM the file will be saved with the files for that client.

Note – This feature will become active upon installation of a future CCE update..

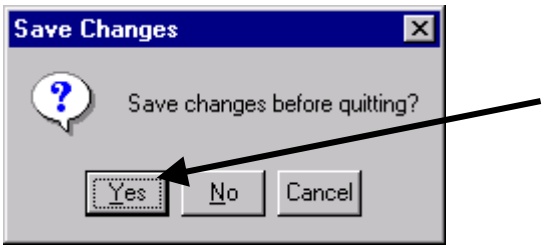
Quitting AWM

From the file menu click on File then Exit,



or press the [Alt] [F] [X] keys on the computer keyboard,
or click on the ✕ in the upper right-hand corner to exit AWM.

- The above action results in the following popup screen



Press the [Enter} key to select Yes or click on the appropriate button.

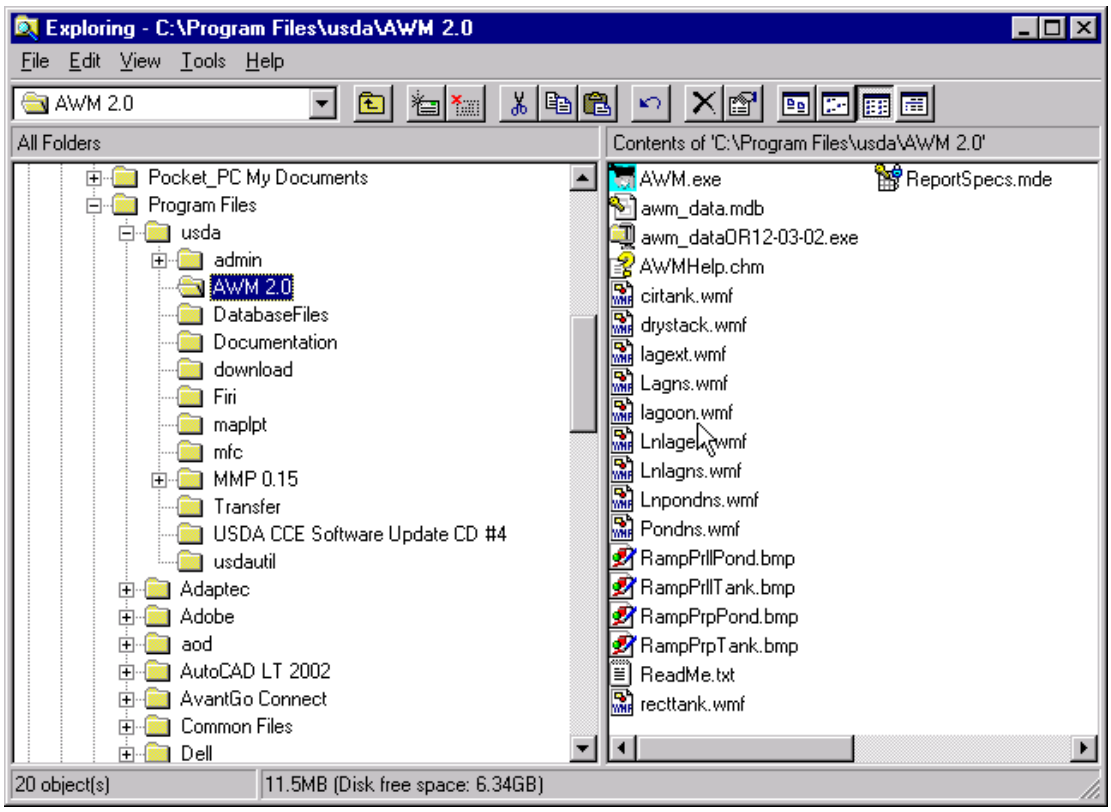
Importing State Database

If AWM is being used for the first time and a state database file has not been developed for the program, a state database file will need to be downloaded from the NRCS National Water and Climate Center web site and imported it into the AWM database. To download a state database for AWM, click on Help->Contents in the AWM main menu and click on "AWM State Databases" in the contents window to access the website to download a state database. Follow the instructions in the previous section on "Installing AWM". Download as many of the state databases as desired from the National Water and Climate Center website to the directory on your computer containing the AWM program, which is usually the C:\Program Files\usda\AWM 2.0 directory.

The procedure for importing a state climate file into AWM is as follows:

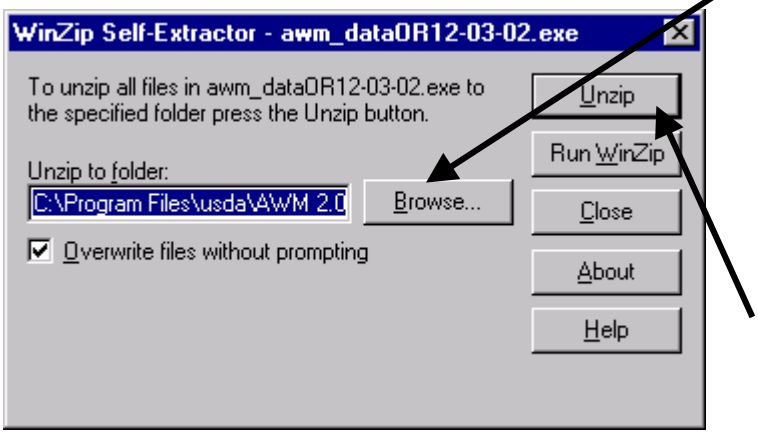
- If the AWM is running, close the program by clicking on the ☒ button in the upper right hand corner of the program window or select File>Close from the AWM main menu.

- From Windows Explorer select the AWM directory, C:\Program Files\usda\AWM 2.0, as shown below:



- Extract the downloaded state database by either:
  - Double clicking on awm_dataXXxx-xx-xx.exe in Windows Explorer, or
  - Clicking **Start**, select **Run**, browse to AWM directory as shown above, select awm_dataXXxx-xx-xx.exe, and press run.

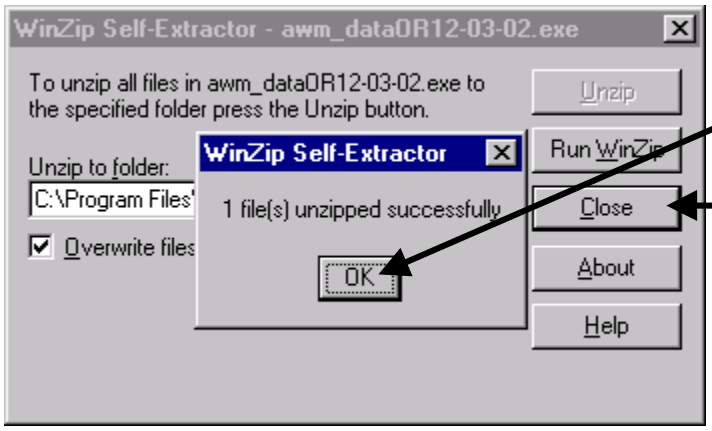
- The above action results in the following popup screen:



If the AWM program is located in a different directory than shown, Click on the Browse... **button to select the directory where the AWM program is located.**

Click on the Unzip **button to extract the state AWM database to the indicated directory.**

- The above action results in the following popup screen:



Click on the OK **button.**

Click on the Close **button to close the WinZip Self Extractor.**

- The program is now ready to be used with the state database that was extracted to the AWM program directory, usually C:\Program Files\usda\AWM 2.0.

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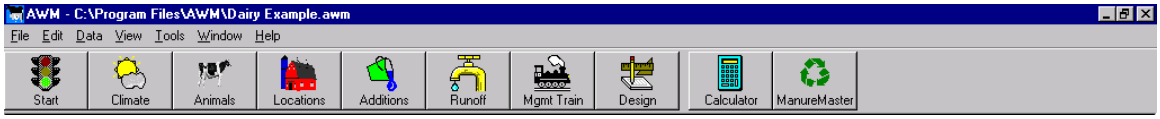
Chapter 3 – Navigating Within AWM

Overview

The process of designing treatment/storage facilities using AWM involves a step-by-step sequence of screens. When developing an initial design, the sequence of screens in the order shown on the toolbar must be followed with the exception of the calculator that can be used within any of the screens.



The screens and their function are as follows:

Start - On this screen the user defines the client, defines the designer, selects the data source (NRCS, MWPS, etc.), and sets up the operating period(s).

Climate - On this screen the user defines the monthly climate parameters, the 25-year, 24-hour precipitation, and other climate-related factors.

Animals - On this screen the user selects animal types and enters the number and average weights. Animal characteristics may be modified and new animal types can be defined within this screen.

Locations - On this screen the user defines locations where wastes are generated. Wastes from different locations may have different additions to the waste stream and the wastes may be routed through different management trains.

Additions - On this screen the user defines any additions to the waste streams such as from bedding, waste water, and flush water.

Runoff - On this screen the user may elect to allow AWM to calculate runoff volumes or to enter volumes calculated outside the program.

Management Train - On this screen the user selects a sequence of treatment/storage components for each waste stream.

Design - On this screen the user specifies the parameters used to size and calculate the dimensions of treatment/storage components. A monthly waste stream budget is displayed on this screen.

Calculator - This is a popup screen that can be used within any of the design screens to calculate unit conversions and perform other calculations. The calculator is not available within the ramp design screen. The calculator must be selected from a separate button within the soil liner design screen.

Manure Master - On this screen the user can generate a gross nutrient budget by selecting crops and entering acres and yield data.

Moving Between Screens

During the initial entry of information the user is moved from screen to screen in sequence by clicking on the OK button on each screen.

At any time the user may move to a previously completed screen by clicking on the large navigation buttons;

When a screen has been completed and the user clicks the OK button, the next navigation button will change from gray to colored.

When a navigation button is in color;

it may be used to move immediately to that screen.

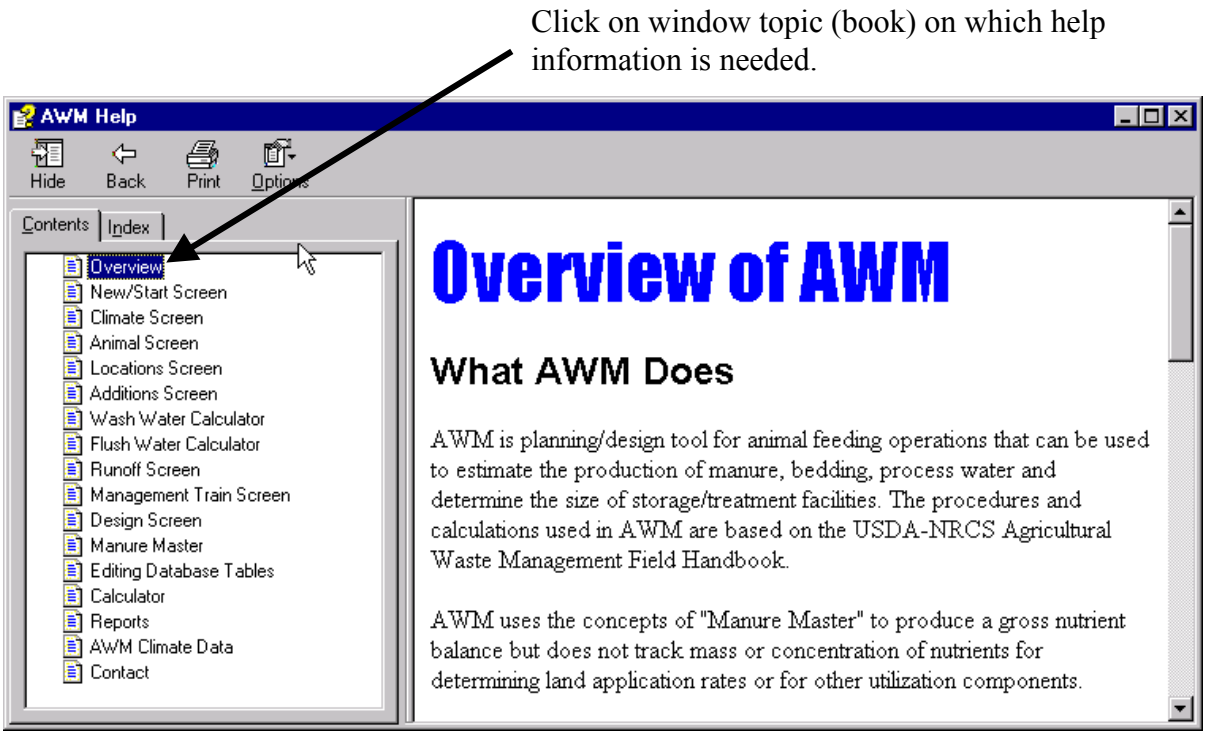
The popup calculator screen is available in any screen so it is always in color.

Any changes to information on a screen will immediately modify values on later screens if the change affects calculated values.

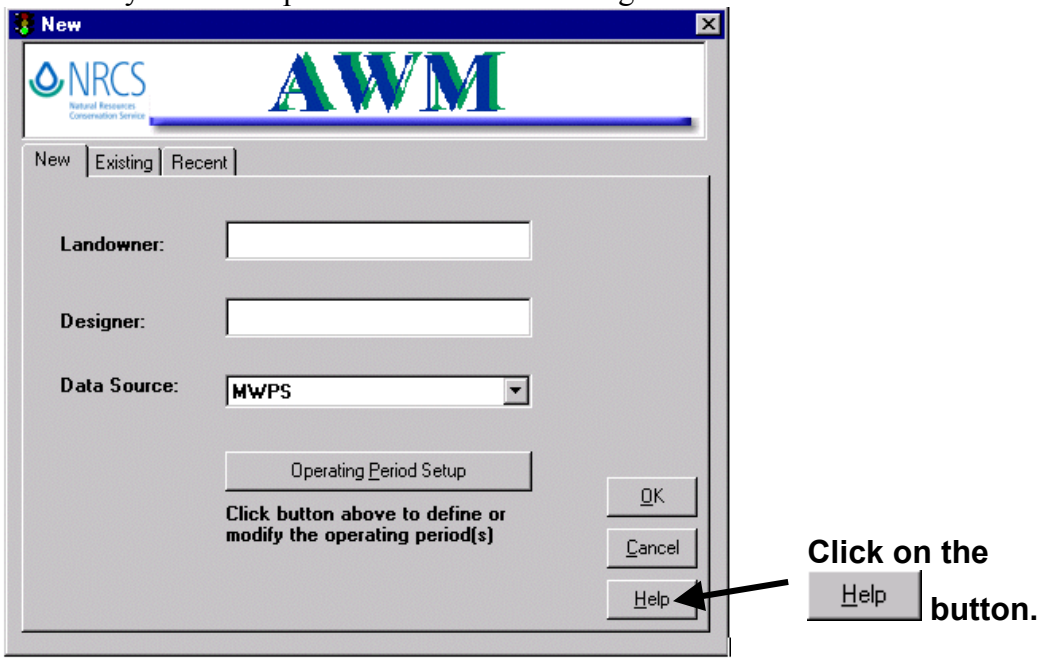
HELP

Help messages providing information on data entry and the operation of AWM can be accessed from the main menu or by pressing the [F1] key on the keyboard.

Clicking on Contents... or the [F1] key reveals the following menu.



Help can also be accessed on each screen by clicking on the Help button or pressing the [F1] key on the keyboard. Help accessed in this manner gives information about the current screen.



Entering Data into AWM

The following provides general guidance on how to enter data into the input fields used in AWM screens:

1. Clicking on an input cell within a screen activates the edit mode. The edit mode is indicated by the cursor blinking at the end of any value or by the text that is already in the cell.

2. Using the arrow keys will exit the edit mode and move the focus rectangle to a new input cell.

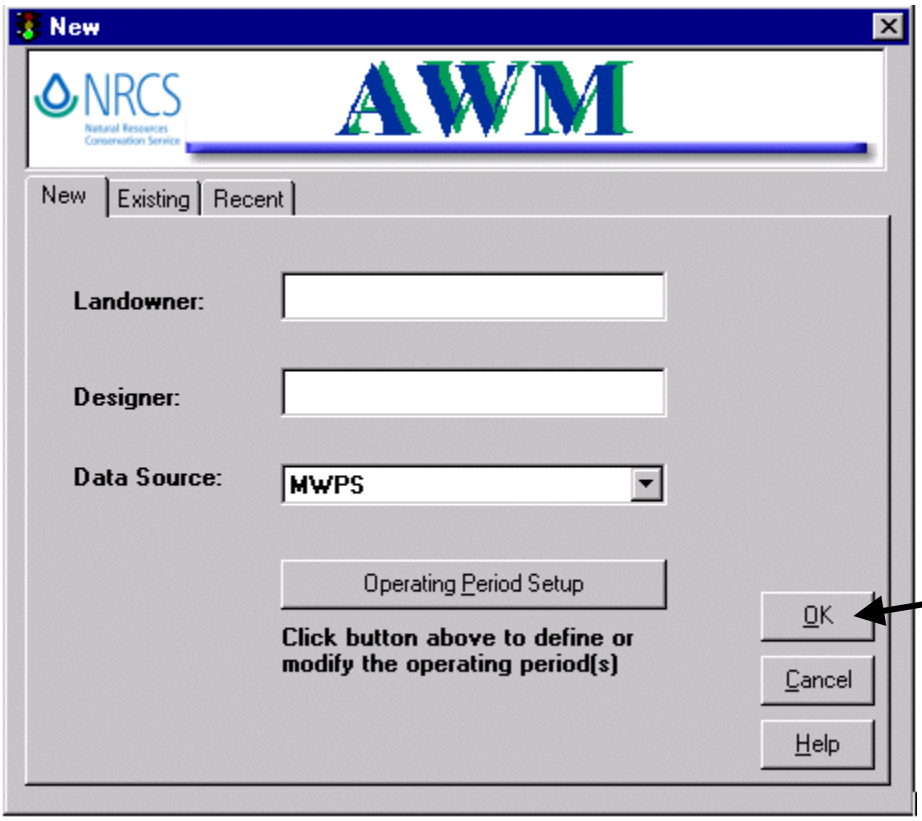
3. Typing any value or text in an input cell that is not in edit mode (cursor is not blinking) replaces whatever was in the cell.

4. Pressing the space bar or backspace within an input cell activates the edit mode (cursor will be blinking at the end of the text in the cell).

5. Pressing [Enter] in an input cell causes the focus rectangle to move to the next input cell while remaining in the edit mode.

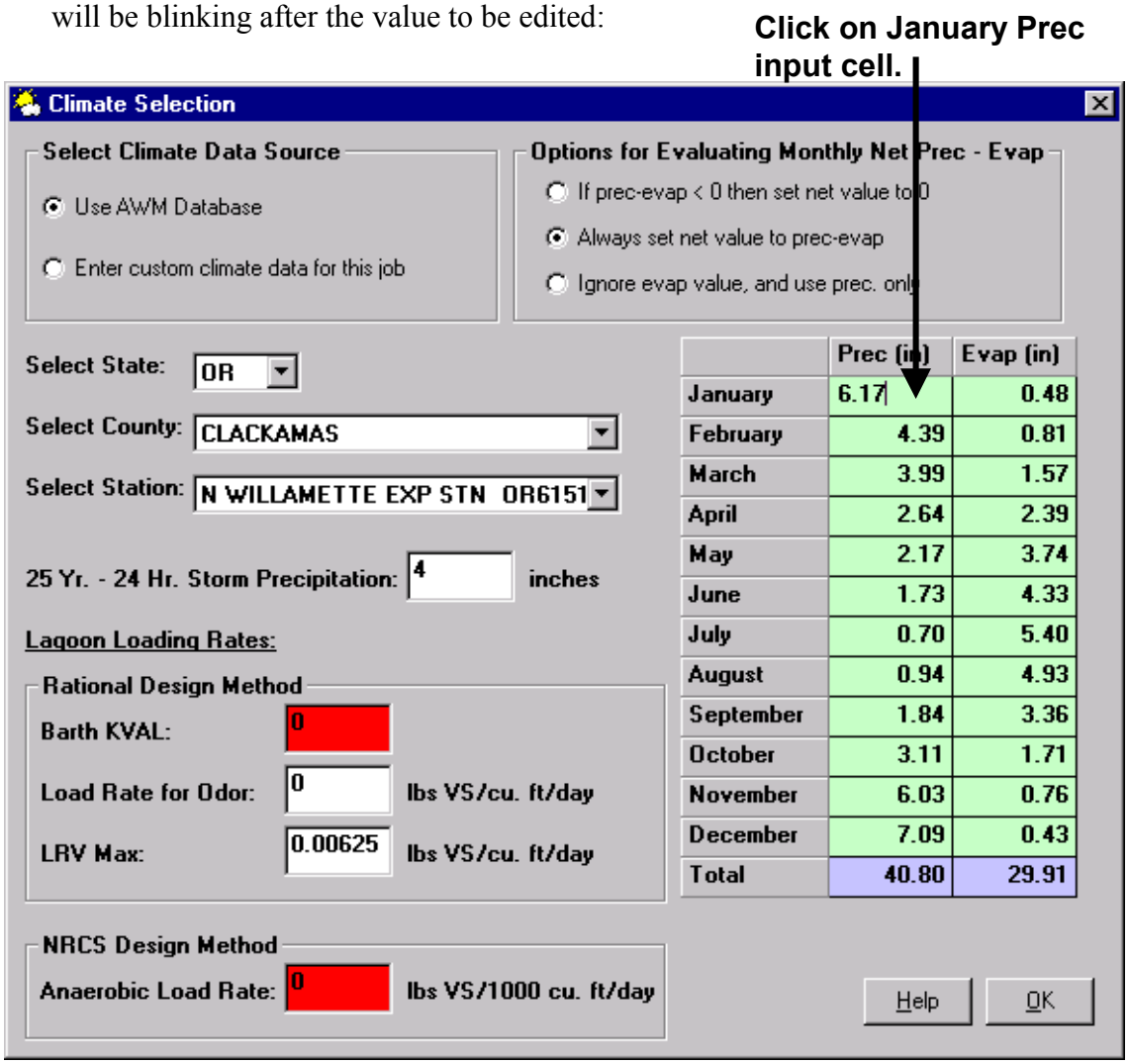
Using the above guidance for entering data into AWM input fields is demonstrated with the following example of changing the precipitation and evaporation values in the AWM Climate Screen.

1. Start AWM and then press the OK button on the **Start** screen,



Click on the OK **button.**

2. Click in the January precipitation cell. This action activates the edit mode, and the cursor will be blinking after the value to be edited:



3. Highlight the value with the mouse or by backspacing and then type in a new value followed by pressing [Enter]. This exits the edit mode and moves the focus rectangle to the February precipitation input cell.

4. Pressing [Enter] in step 3 above allows one of two actions to be taken in the February precipitation input cell:

   a.) Either type in a new value replacing whatever value is in the cell or,

   b.) Press the backspace key to activate the edit mode indicated by the cursor blinking at the end of the value or text. This allows the value in the cell to be highlighted with the mouse or backspacing and then type in a new value.

5. Press [Enter] to go to the next cell.

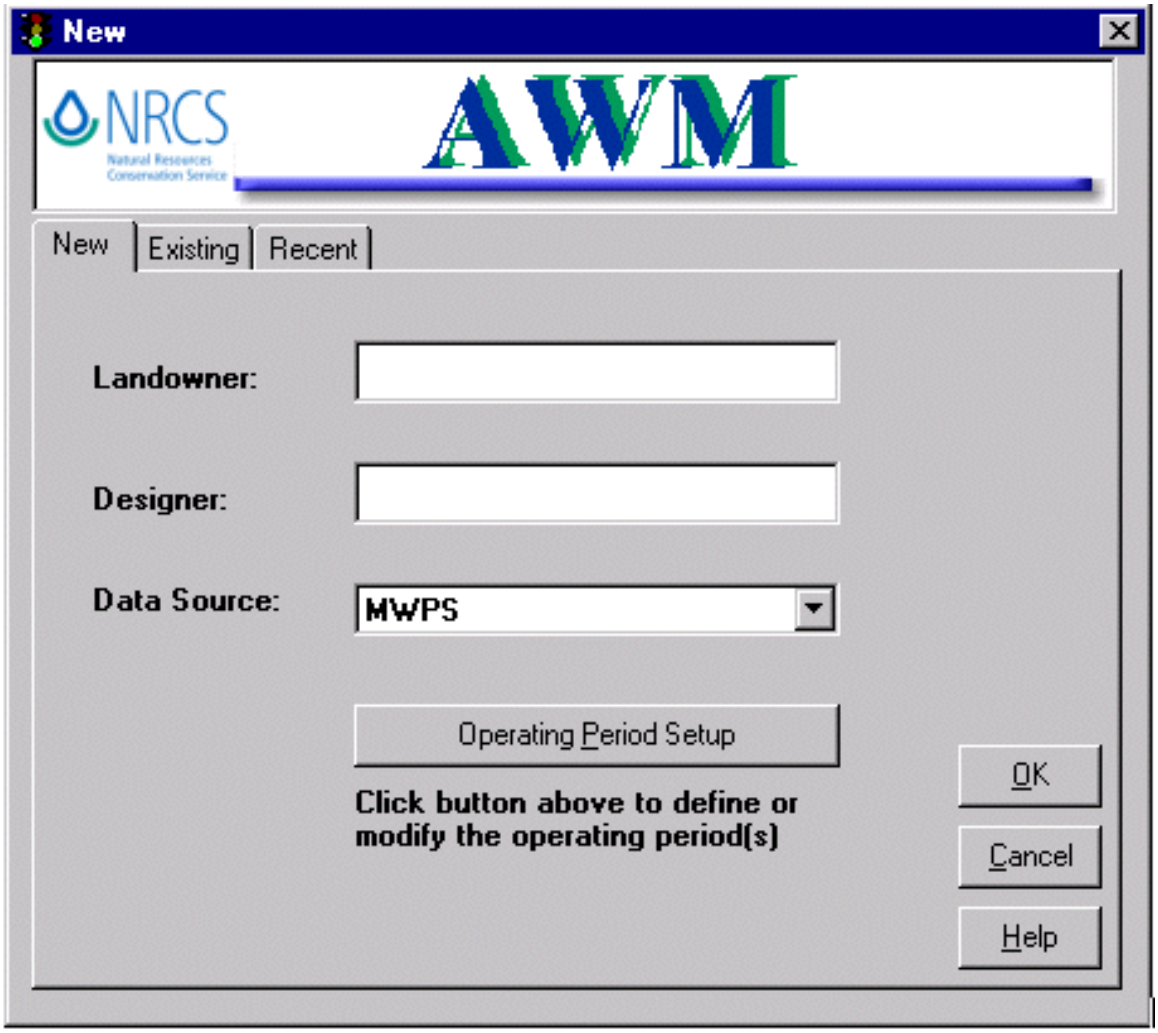
6. Steps 4 and 5 can be repeated for each cell that requires editing.

Note: An input cell is shaded red when the value in the cell is outside the range of reasonable values stored in the database which can be edited in the Tools -> Options menu.

Chapter 4 – Running AWM

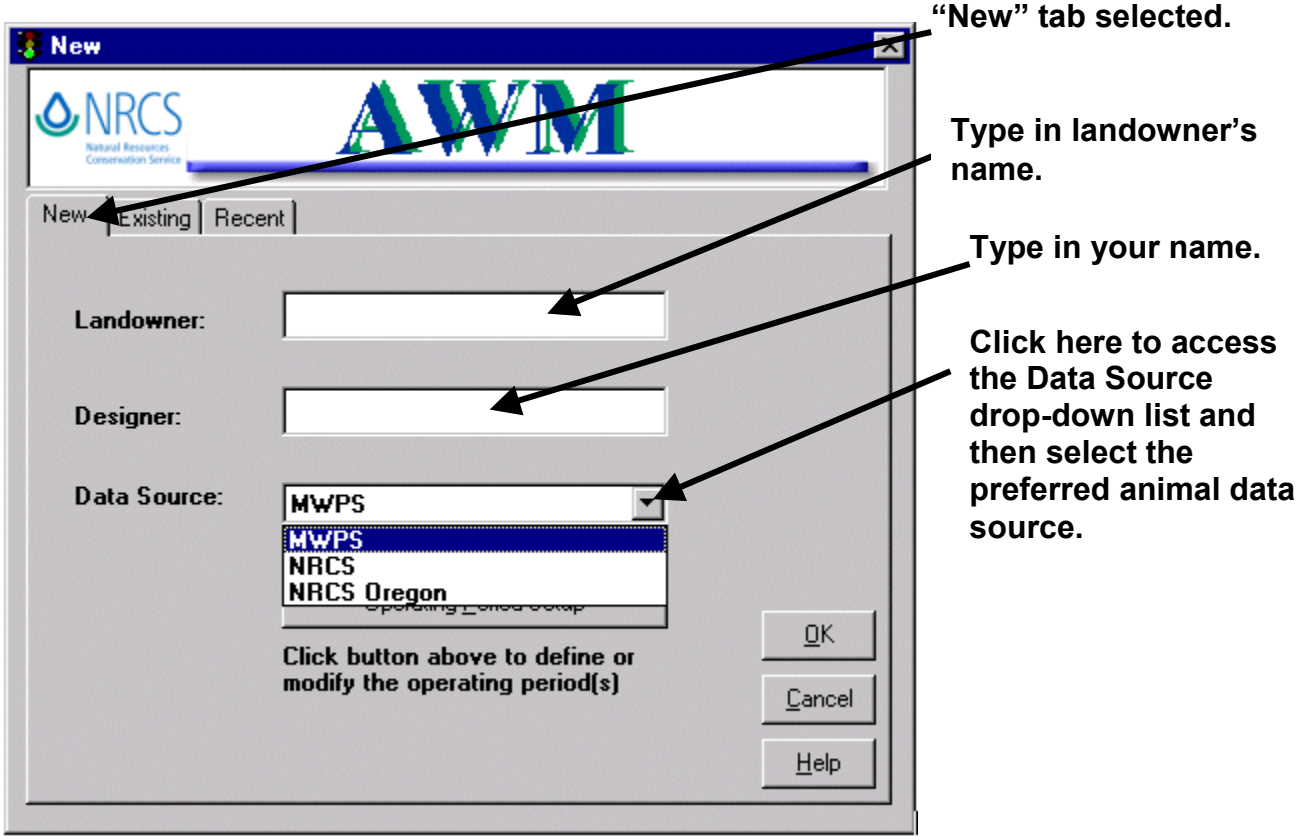
Start Screen

AWM may be started in a number of manners as explained in Chapter 2. When AWM is opened without a specific design file it will open with the following screen.

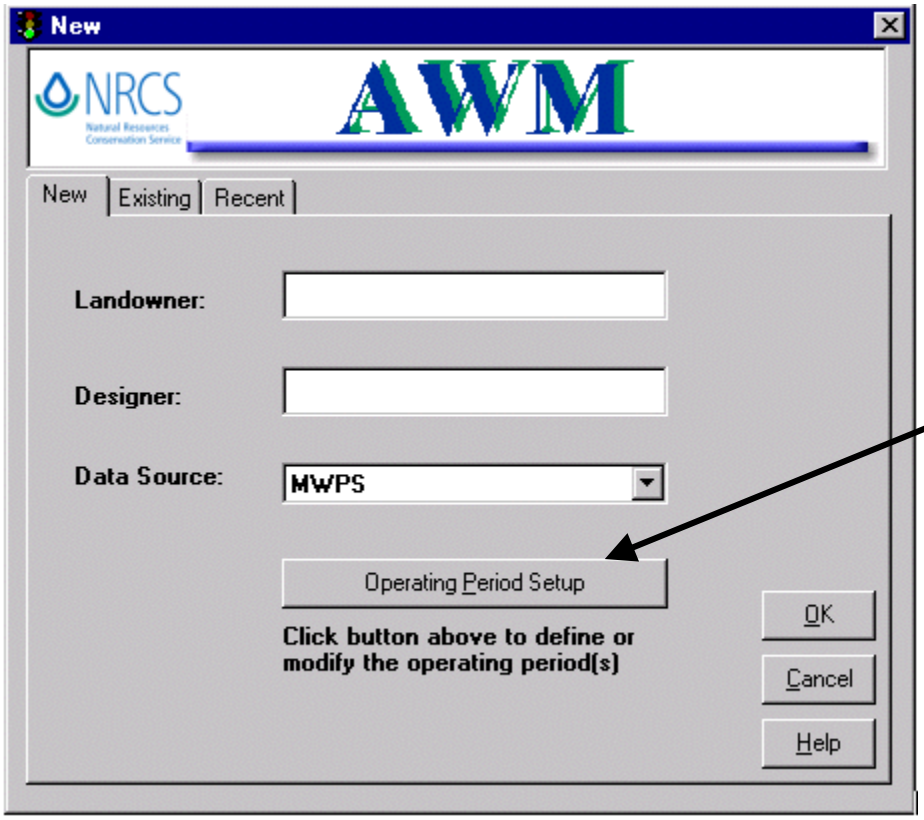


Start Screen

The illustration below shows the "New" tab selected. This is also the default setting.



Start Screen

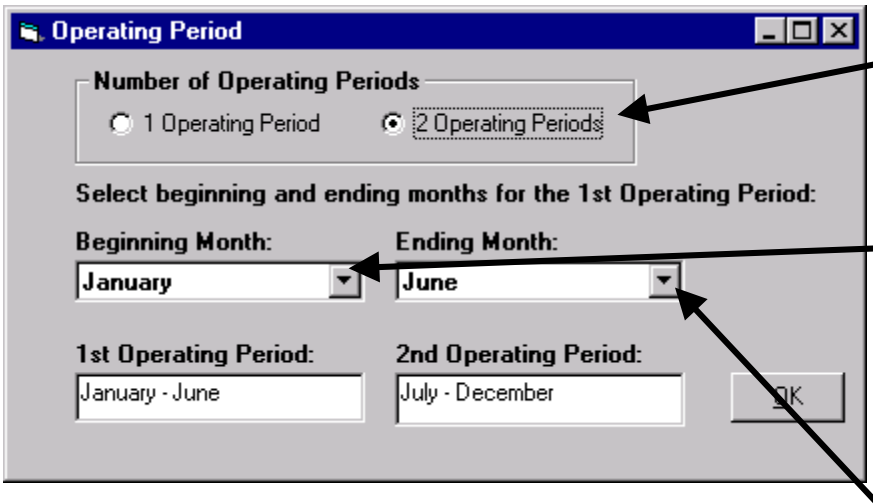


Click on the Operating Period Setup **button if the farm has more than one operating period.**

Start Screen

Operating Periods

AWM has two options for defining operating periods. The screen shown below will appear when the Operating Period Setup button is clicked on. Click on the radio button 1 Operating Period for 1 operating period when the facility is operated the entire year without variation. For example this option would be selected for a dairy where animals are in confinement for the entire year. Click on the radio button 2 Operating Periods for 2 operating periods when a facility operates in two distinct periods. An example of when this option would be selected is for a dairy that keeps its animals in confinement for a part of the year and pastures the remainder.



"2 Operating Periods" are selected.

Click here to access the Beginning Month drop-down list and click on the beginning month of first operating period.

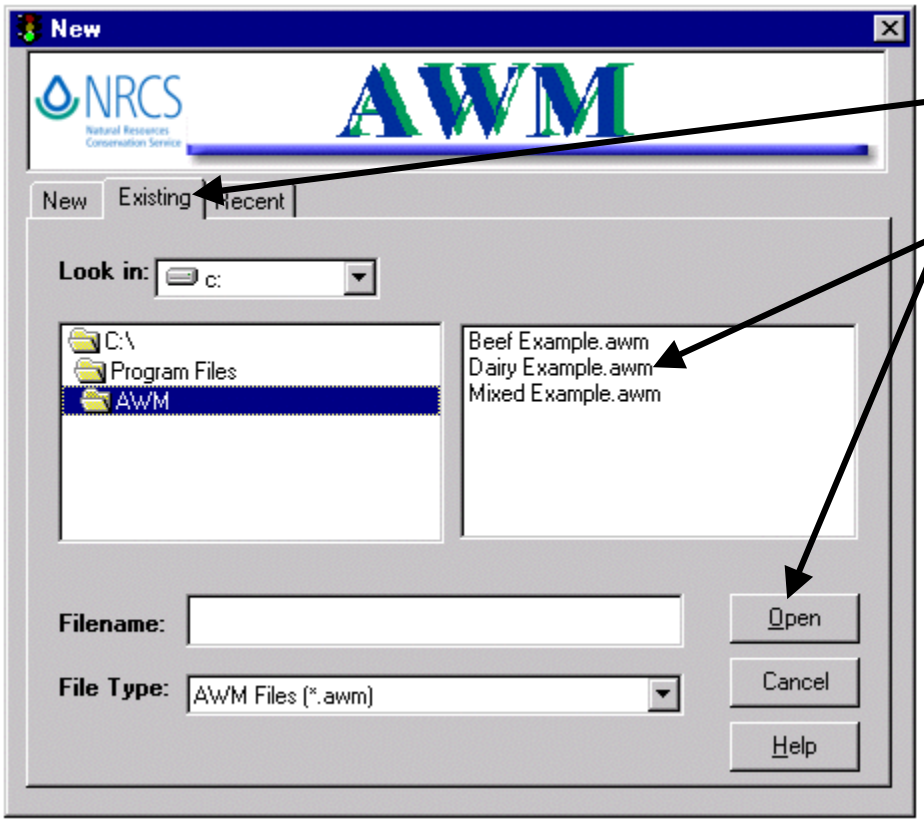
Click here to access the Ending Month drop-down list and click on the ending month of first operating period.

If "2 Operating Periods" are selected, the beginning and ending month for the first operating period must be selected. Once this period is selected, AWM provides the second period as the remaining months. The operating period is from the first day of the beginning month to the last day of the ending month.

Monthly precipitation and runoff for the entire year is used in the design of waste treatment/storage facilities regardless of the operating period.

Start Screen

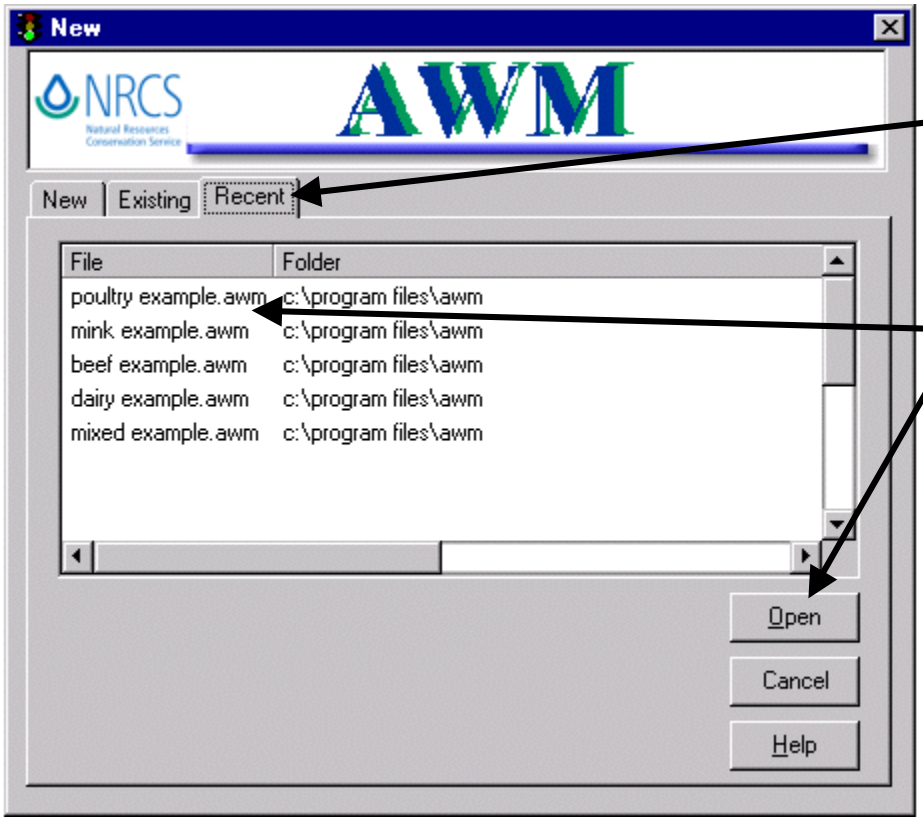
To continue work on a previously saved job/design, select either the “Existing” or “Recent” tab. Selecting the “Recent” tab will show the last ten jobs saved. Selecting the “Existing” tab will show all the previously saved jobs in a particular directory.



Select “Existing” tab for a list of all previously saved jobs.

Click on the desired file and click “Open” to load the stored data into AWM from the selected file.

Start Screen



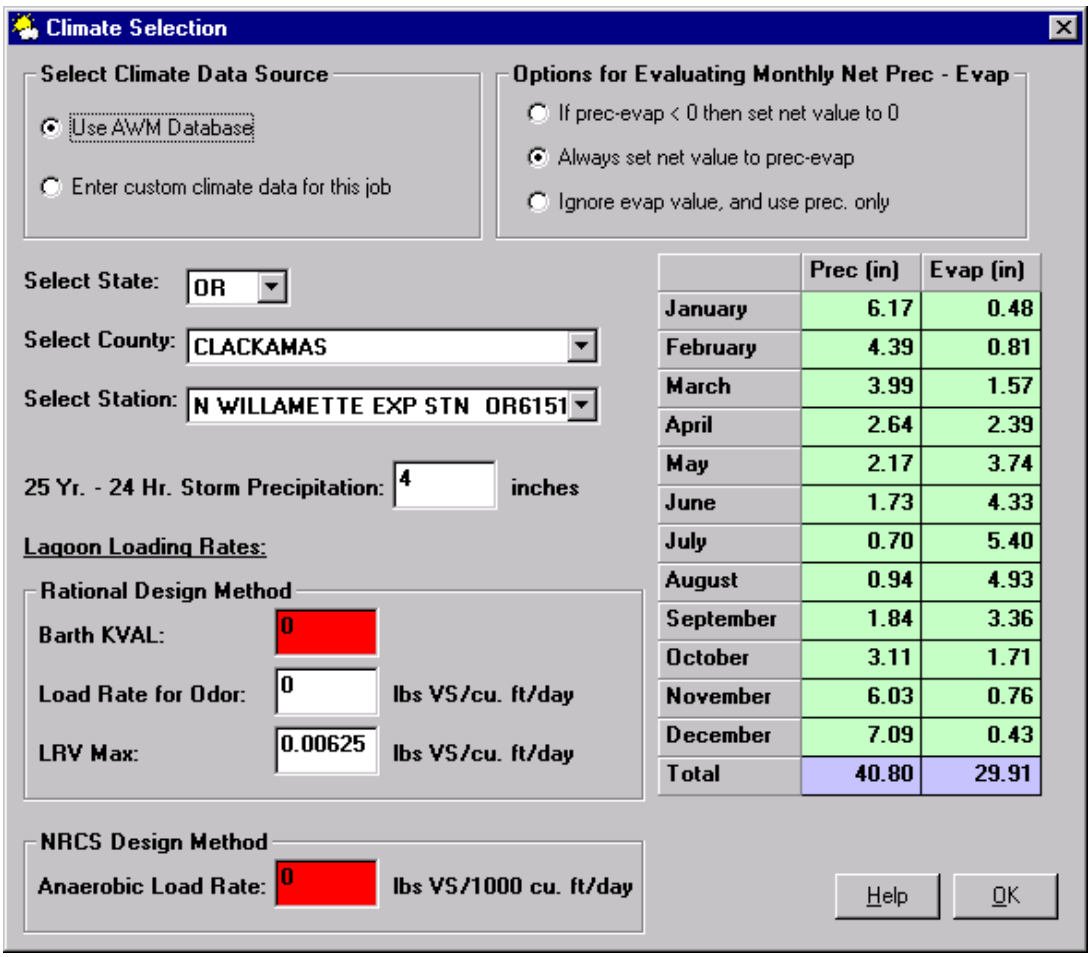
Select "Recent" tab for a list of the last 10 jobs that were loaded when the user exited AWM.

Click on the desired file and click the 

button to load the stored data into AWM from the selected file.

Climate Screen

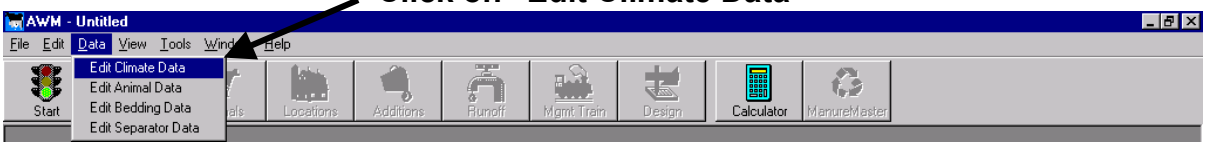
The climate screen allows the user to define the monthly precipitation and evaporation, the 25 year – 24 hour precipitation, and the anaerobic lagoon volatile solids loading rates. There are two options for defining the climate data used within AWM. One is to use the AWM database, which is the default option shown below, and the other is to enter custom climate data for the job. Any input cell shaded red means the data it contains is outside the range of values stored in the data validation database. The values in the data validation database define the range of expected values for an entry as a check for the user. The values in the data validation database can be edited in the Tools -> Options menu.



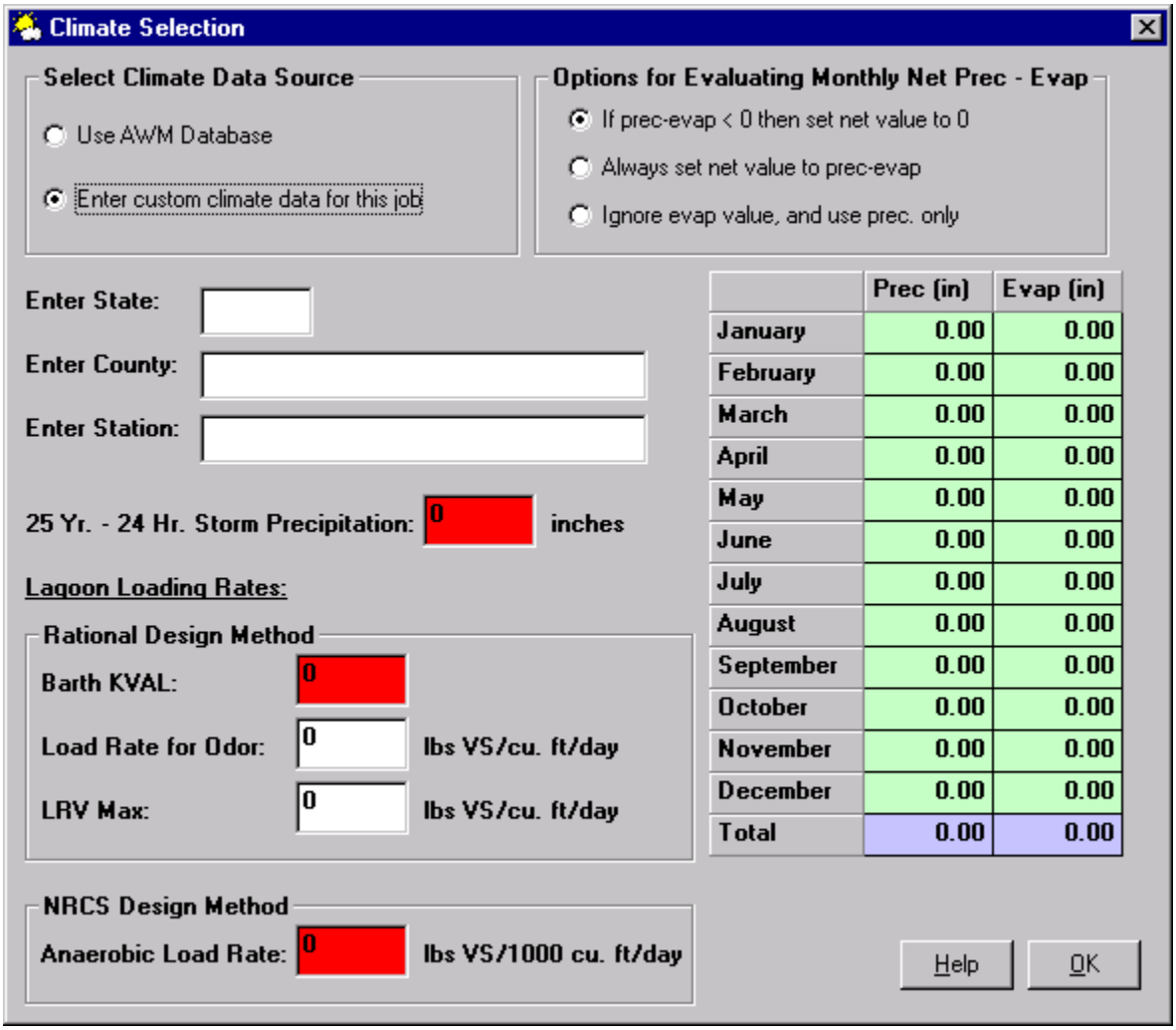
Climate data populating the screen when the 

option is selected is based on the State, County, and Station selected from the drop-down lists. The monthly precipitation, monthly evaporation, 25-year, 24-hour precipitation, and the lagoon loading rate may all be edited by clicking on the input cell to be changed. Changes made in this manner will only be in effect and saved for the current job. Permanent changes can be made by clicking on Data > Edit Climate Data on the AWM main menu as shown below. For more on editing, see Chapter 6, "Modifying the AWM Databases."

Click on "Edit Climate Data"



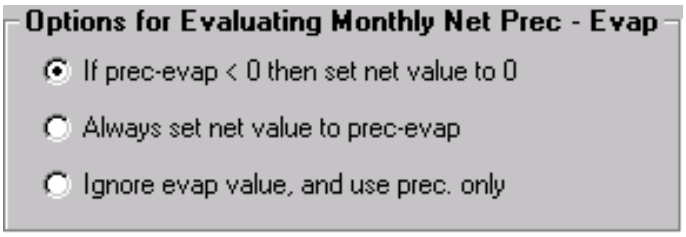
Climate Screen



All of the climate data populating the climate screen is cleared, as shown above, when the  option is selected. With this option the user completes all data fields. The data entered in this manner will be saved with the current job and is not available for future jobs. To have climate data available for future jobs it is necessary to modify the AWM database. Permanent changes to the climate database can be made by clicking on Data > Edit Climate Data on the AWM main menu as shown below. For more on editing, see Chapter 6, "Modifying the AWM Databases."

Climate Screen

AWM has three options for accounting for precipitation and evaporation in the design of waste treatment/storage facilities.



Select this option to consider evaporation only to the extent it does not exceed precipitation. For the example shown on the previous page, AWM would set precipitation minus evaporation to 0 inches for the month of July.

Select this option to consider evaporation even when it will cause a deficit value for precipitation minus evaporation. For the example shown on the previous page, AWM would set the value of precipitation minus evaporation to –4.7 inches for the month of July.

Select this option when evaporation should be ignored. For the example shown on the previous page, AWM would set the value of precipitation minus evaporation to be 0.7 inches for the month of July. This may an appropriate option for waste storage facilities and anaerobic lagoons where a crust will form that may impede evaporation.

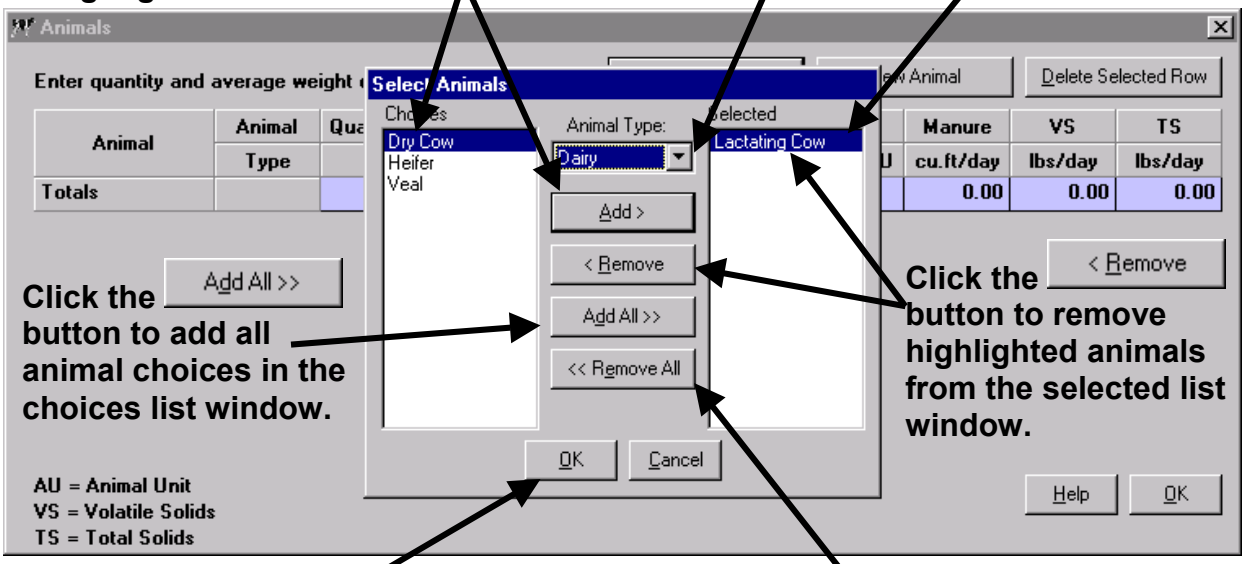
Animals Screen

The following Animals screen appears when a new design file is being created within AWM so a user can select animal types and descriptions from the data file source selected on start screen. AWM allows the user to select mixed animal types and descriptions.

2. Click on the animal description in the choices list window and click the add button to select the highlighted choice.

1. Click on the drop-down list to select the animal type.

3. The animals selected are shown in the selected list window.



Click the Add All >> button to add all animal choices in the choices list window.

Click the < Remove button to remove highlighted animals from the selected list window.

Click the OK button when done.

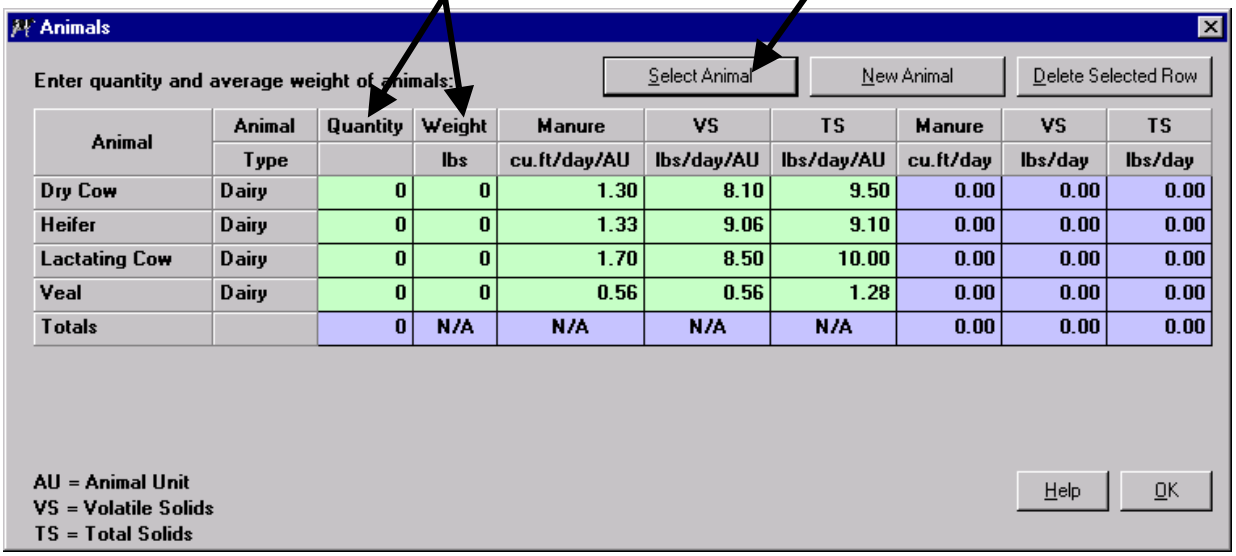
Click the Add All >> button to remove all animals from the selected list window.

Animals Screen

The following screen shows the Animals screen populated with animals selected from the AWM MWPS data file.

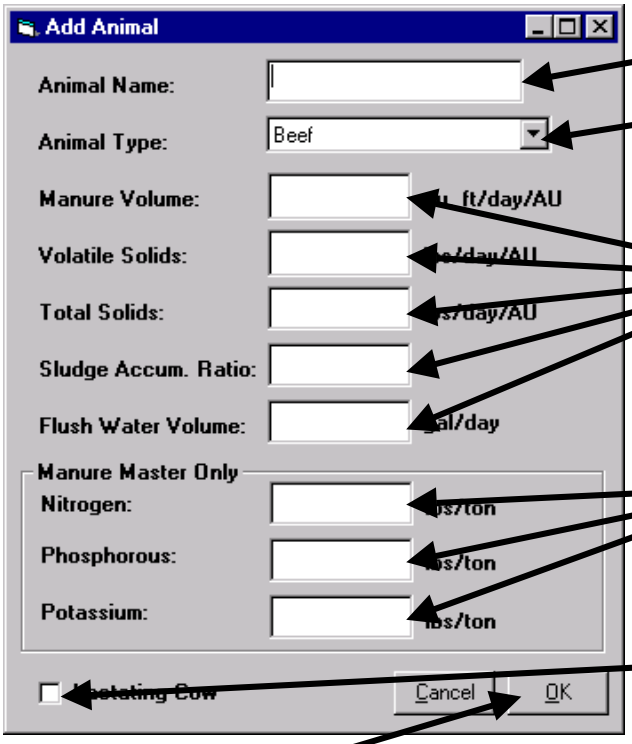
Enter the quantity and average weight in pounds for each animal selected.

Animals may be added at any time by clicking on the Select Animal **Button.**



Animal	Animal Type	Quantity	Weight lbs	Manure cu.ft/day/AU	VS lbs/day/AU	TS lbs/day/AU	Manure cu.ft/day	VS lbs/day	TS lbs/day
Dry Cow	Dairy	0	0	1.30	8.10	9.50	0.00	0.00	0.00
Heifer	Dairy	0	0	1.33	9.06	9.10	0.00	0.00	0.00
Lactating Cow	Dairy	0	0	1.70	8.50	10.00	0.00	0.00	0.00
Veal	Dairy	0	0	0.56	0.56	1.28	0.00	0.00	0.00
Totals		0	N/A	N/A	N/A	N/A	0.00	0.00	0.00

If another animal type is needed but not shown in the AWM database, click on the New Animal button that will result in the popup screen shown below.



Enter the name of the animal type being added

Click on the drop-down list to select the animal type being added.

Enter the manure volume, volatile solids, total solids, sludge accumulation ratio, and flush water as appropriate.

Enter the pounds per ton of Nitrogen, Phosphorous, and Potassium that will be generated by the animal being added after all losses are accounted for.

Click on this box if animal type involves lactating cows. This associates the new animal with a wash water volume per animal.

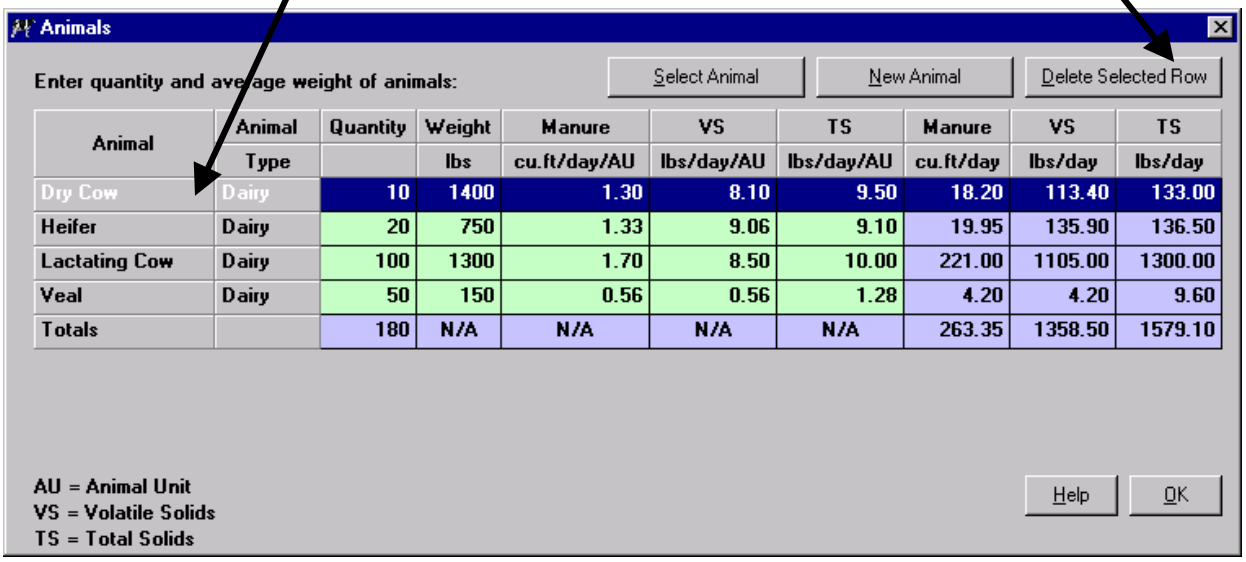
Click the OK **button when done.**

Animals Screen

A row may be deleted from the Animals screen by selecting the row and clicking on the Delete Selected Row as shown on the screen below.

1. **Click on the animal cell to select the row to be deleted.**

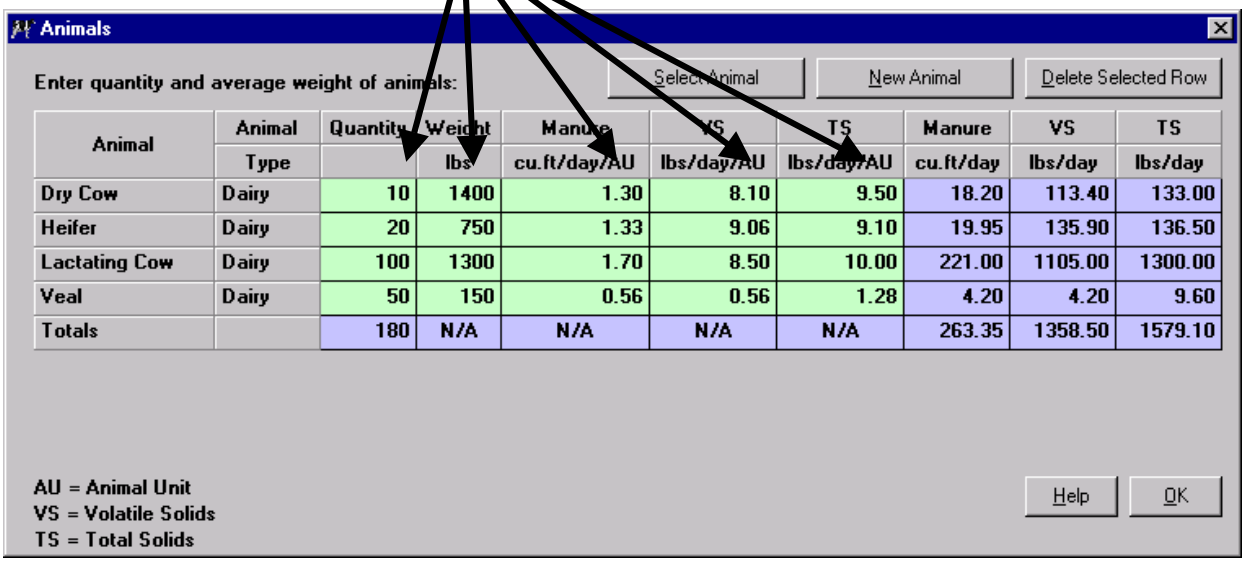
2. **Click on the Delete Selected Row button or press the [Delete] key on the keyboard to delete the selected row.**



Animal	Animal Type	Quantity	Weight lbs	Manure cu.ft/day/AU	VS lbs/day/AU	TS lbs/day/AU	Manure cu.ft/day	VS lbs/day	TS lbs/day
Dry Cow	Dairy	10	1400	1.30	8.10	9.50	18.20	113.40	133.00
Heifer	Dairy	20	750	1.33	9.06	9.10	19.95	135.90	136.50
Lactating Cow	Dairy	100	1300	1.70	8.50	10.00	221.00	1105.00	1300.00
Veal	Dairy	50	150	0.56	0.56	1.28	4.20	4.20	9.60
Totals		180	N/A	N/A	N/A	N/A	263.35	1358.50	1579.10

The Quantity, Weight, Manure, VS, and TS may be edited by clicking on the input cell and typing in the desired value as shown on the screen below.

For any of the selected animals, click on the desired input cell to edit the displayed data.



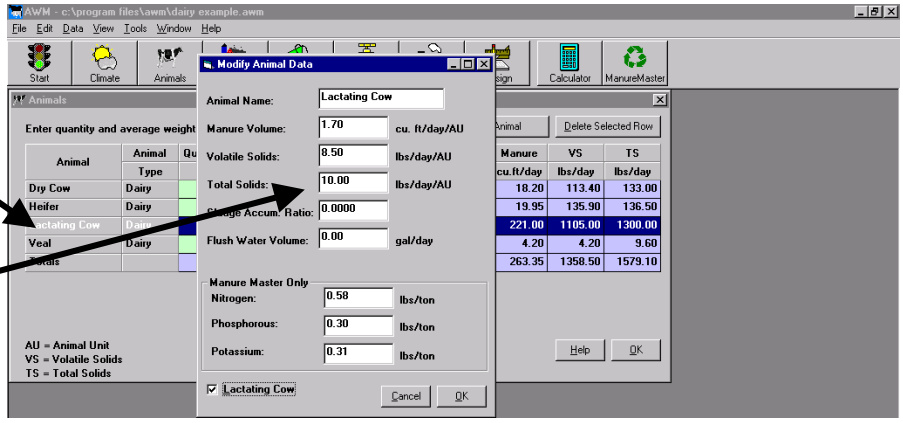
Animal	Animal Type	Quantity	Weight lbs	Manure cu.ft/day/AU	VS lbs/day/AU	TS lbs/day/AU	Manure cu.ft/day	VS lbs/day	TS lbs/day
Dry Cow	Dairy	10	1400	1.30	8.10	9.50	18.20	113.40	133.00
Heifer	Dairy	20	750	1.33	9.06	9.10	19.95	135.90	136.50
Lactating Cow	Dairy	100	1300	1.70	8.50	10.00	221.00	1105.00	1300.00
Veal	Dairy	50	150	0.56	0.56	1.28	4.20	4.20	9.60
Totals		180	N/A	N/A	N/A	N/A	263.35	1358.50	1579.10

Animals Screen

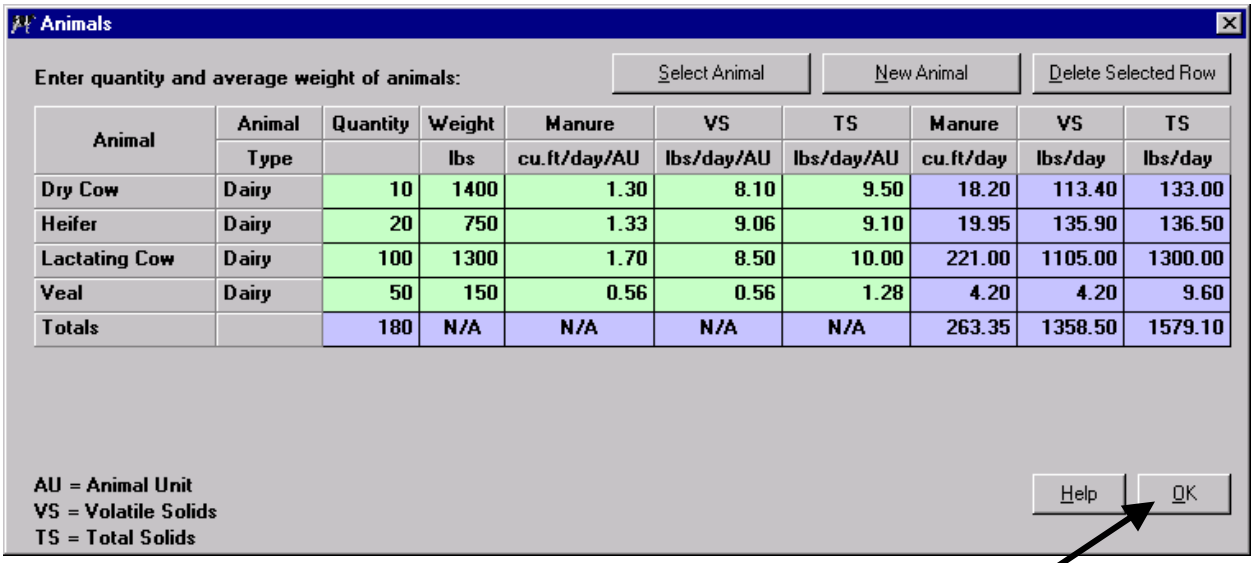
The values for an animal type appearing on the Animals screen may also be edited by double clicking on the animal type as shown on the screen below.

Double click on animal

Revise values in resulting popup screen as necessary.



Changes made by editing data within the Animals screen will only apply to the current job and is not available for future jobs. To have animal data available for future jobs it is necessary to modify the AWM database. Permanent changes can be made by clicking on Data > Edit Animal Data on the AWM main menu as shown below. For more on editing, see Chapter 6, "Modifying the AWM Databases".



Animal	Animal Type	Quantity	Weight lbs	Manure cu.ft/day/AU	VS lbs/day/AU	TS lbs/day/AU	Manure cu.ft/day	VS lbs/day	TS lbs/day
Dry Cow	Dairy	10	1400	1.30	8.10	9.50	18.20	113.40	133.00
Heifer	Dairy	20	750	1.33	9.06	9.10	19.95	135.90	136.50
Lactating Cow	Dairy	100	1300	1.70	8.50	10.00	221.00	1105.00	1300.00
Veal	Dairy	50	150	0.56	0.56	1.28	4.20	4.20	9.60
Totals		180	N/A	N/A	N/A	N/A	263.35	1358.50	1579.10

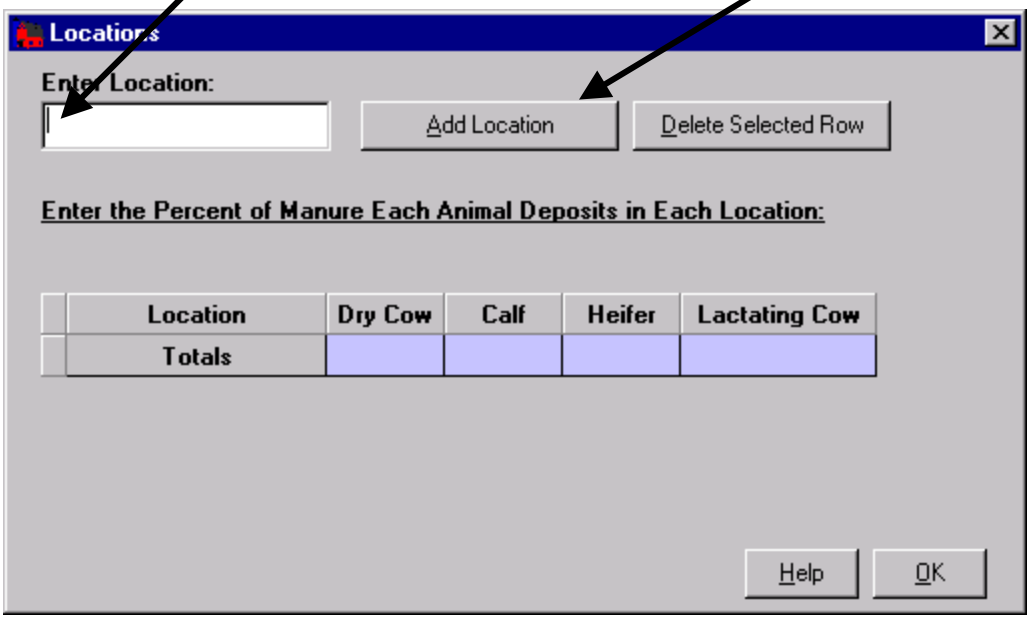
Click the OK button when done editing the Animals Screen.

Locations Screen

The purpose of the Locations screen is to define where the animals deposit their manure throughout a day for each operating period. It also establishes a manure waste stream from a location to which waste water, flush water, and bedding are added to form the total waste stream directed to agricultural waste management system treatment/storage components such as a waste storage facility or waste treatment lagoon.

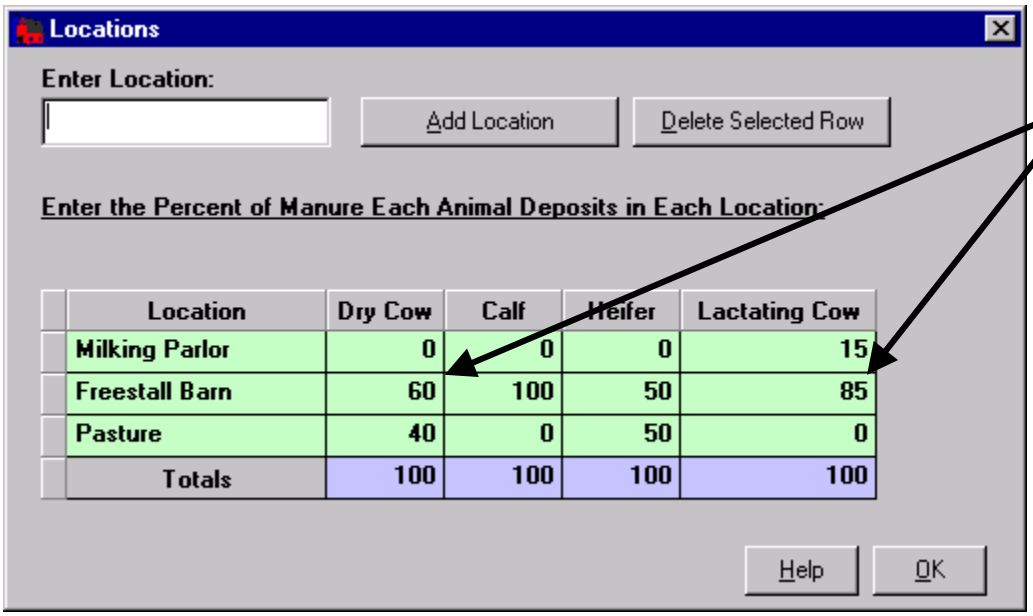
Type in the name of a location where animals spend time.

After typing in the name of the location, click the Add Location **button or press the [Enter] key.**



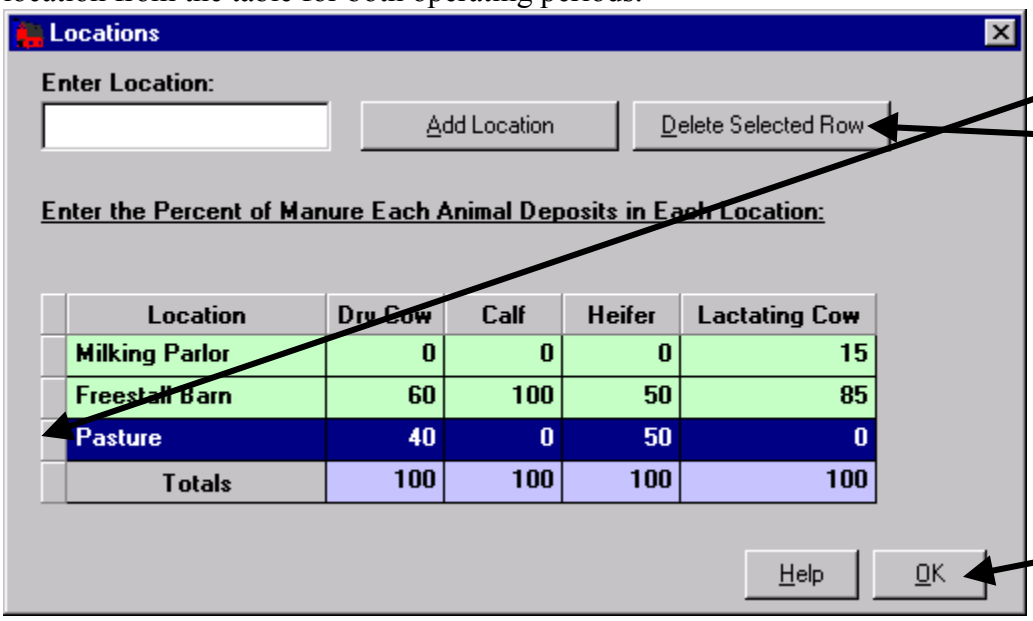
Locations Screen

Once all the locations have been entered, the percent of manure deposited by each animal type in each location must be entered as shown on the screen below. Please note this is the percent of manure and not the percent of time. Judgement based on observation will be required for making this determination because it varies widely. The percent manure must total 100 percent for each animal type. If two operating periods were selected on the start screen, a location table will be presented for each operating period.



Enter the percent of manure each animal type deposits in each location for both operating periods.

To delete a location first select the row by clicking on the narrow cell just to the left of the location as shown on the screen below. This highlights the row. Now click on the Delete Selected Row button. Rows can only be selected and deleted from the first operating period table if more than one operating period was selected on the Start screen. This action deletes the location from the table for both operating periods.



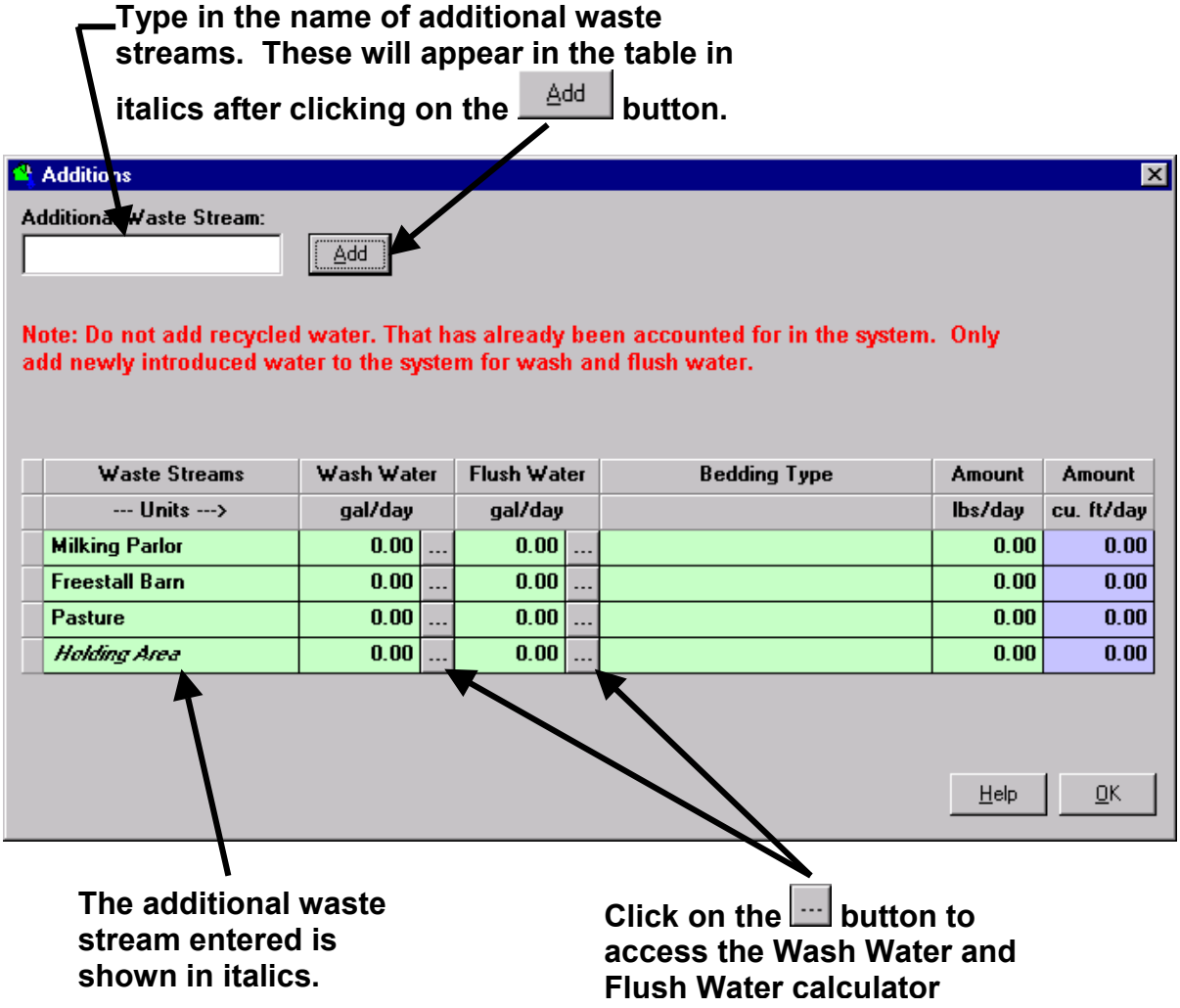
To delete a row, click here to highlight the row, and then click on Delete Selected Row button or press the [Delete] key on the keyboard. Rows can only be selected and deleted from the 1st operating period table.

Click the OK button when done editing the Locations screen.

Additions Screen

The purpose of this screen is to characterize the amount of flush water, wastewater, and bedding added to the manure waste stream for each of the locations identified on the Locations screen.

To add additional locations where waste is generated, enter the name of the location and click on the Add button as shown on the screen below.



The total wash water and flush water in gallons per day may be entered directly or by using the pop-up calculator. The pop-up calculator screen is selected by pressing the ... button next to the Wash Water or Flush Water input cell as shown on the screen above.

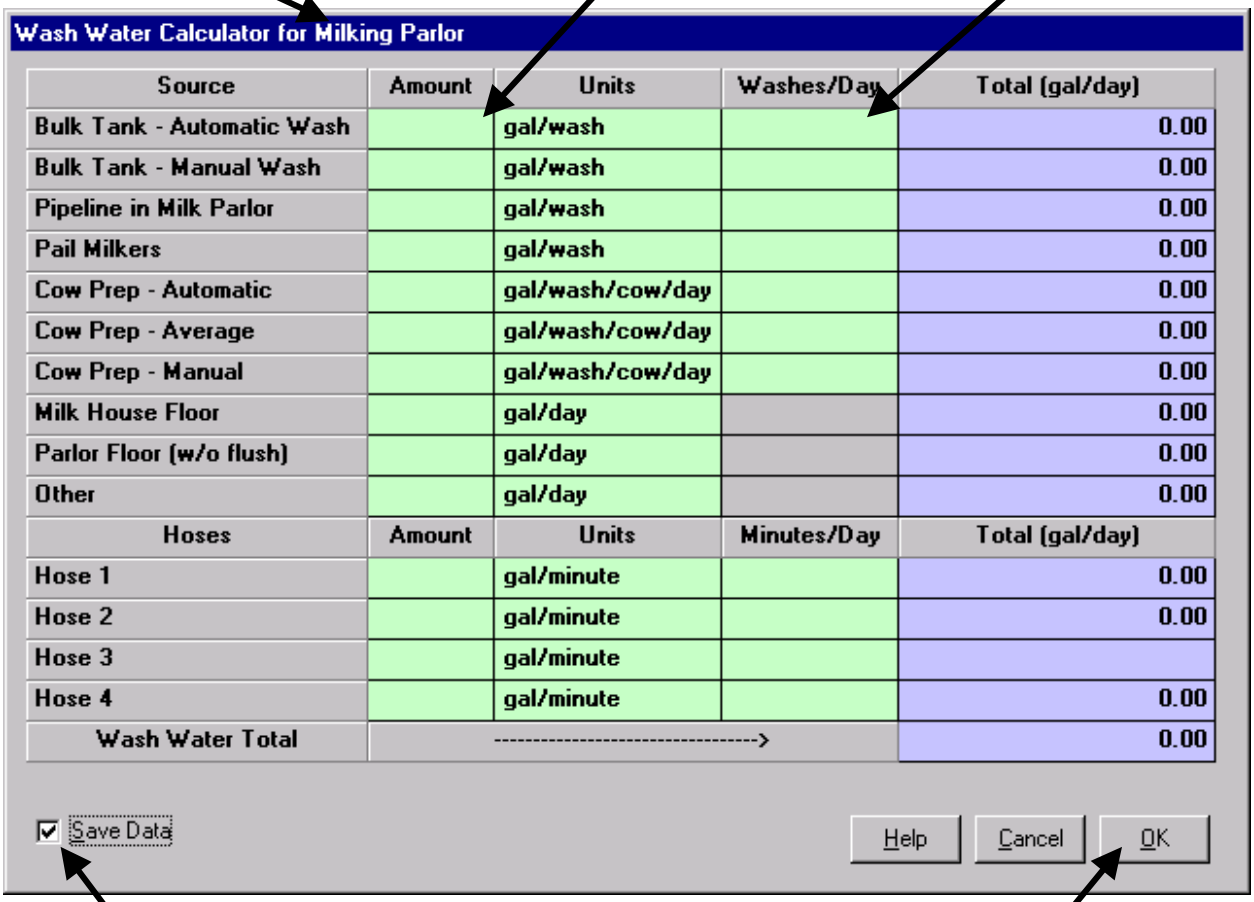
Additions Screen

The calculator pop-up screen for wash water follows:

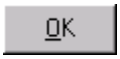
Location that wash water is being calculated for.

Enter the amount that applies to the operation in gallons per unit that is appropriate for each Source or Hose.

Type in the washes or minutes per day for each operation where an amount was entered for a Source or Hose.



Checking this box means the last data entering into the Wash Water screen will be saved and displayed the next time the screen is accessed.

Click the 

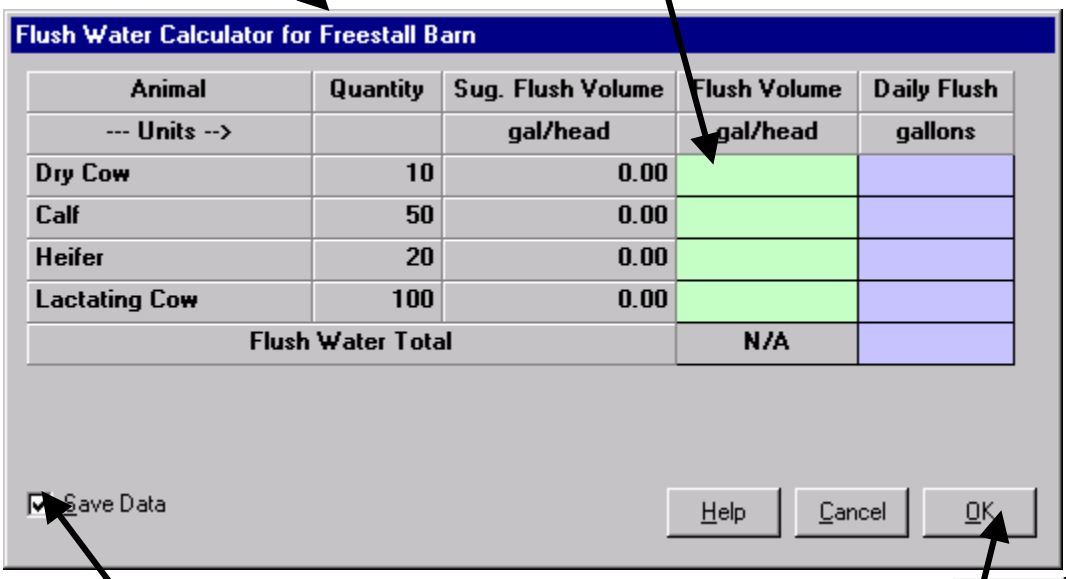
button when done editing the Wash Water screen.

Additions Screen

The calculator pop-up screen for flush water follows:

Location that flush water is being calculated for.

Enter the amount of flush water used for each animal in gallons per head(animal).



Checking this box means the last data entering into the Flush Water screen will be saved and displayed the next time the screen is accessed.

Click the  **button when done editing the Flush Water screen.**

Take care to indicate a flush volume for only those animals identified as spending time at the location on the Locations screen. Also please note that if recycled water is used for flushing, values entered should only be to the extent that fresh non-recycled water is added to the system.

Clicking on the  check box will save the data in the Wash Water and Flush Water calculator for the current design session of AWM. All values entered into the Wash Water and Flush Water calculator will be lost once the AWM design session is closed.

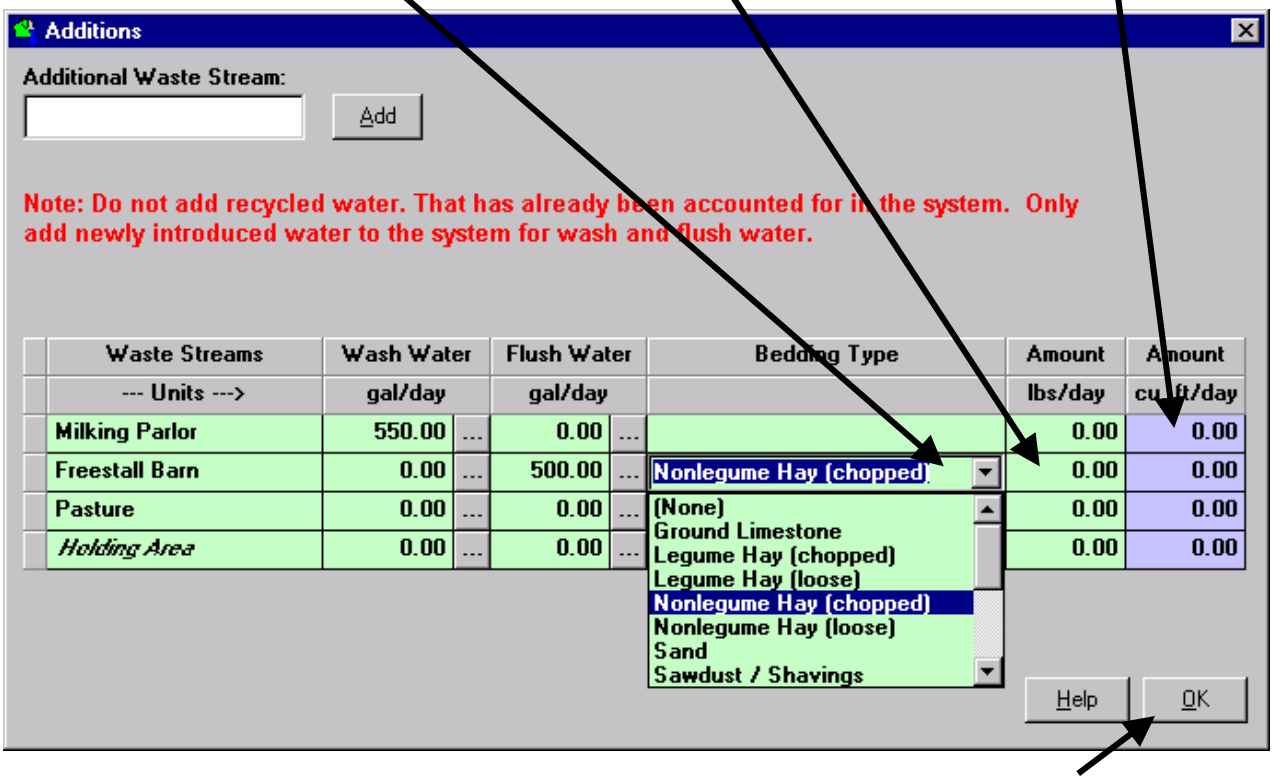
Additions Screen

On the Additions screen shown below bedding is added to a waste stream by indicating the amount per day added at each location in pounds per day. If bedding is not added every day, the amount used should be converted to an equivalent pounds per day.

Click here to access drop-down list of bedding, then click on bedding type used.

Type in amount of bedding added in terms of pounds per day.

The amount of bedding in cubic feet per day is automatically displayed based on the density stored in the bedding database.



Click the  **button when done editing the Additions screen.**

Bedding volumes computed by the AWM program will be dependent on the effective bedding densities stored in the AWM database. Bedding densities can be viewed and permanently changed by clicking on Data > Edit Bedding Data on the AWM main menu as shown below. For more on editing, see Chapter 6, "Modifying the AWM Databases".

Runoff Screen

The Runoff screen estimates the contaminated runoff that must be managed by the waste management system. Runoff volumes estimated by AWM are conservative overestimates. Because of this, the user is encouraged to use a method outside the program to determine the monthly and the 25-year, 24-hour runoff volumes, especially when larger watersheds are involved.

AWM computes runoff for two types of "watersheds:"

- impervious "watersheds" such as roofs and frequently scraped concrete slabs; and
- pervious watersheds including feedlots with a manure pack..

The runoff volume from only one drainage area for each type of watershed is computed. If a system design requires evaluation of more than one drainage area in one or both types of watersheds, the runoff volumes will need to be computed outside the program and entered as demonstrated below.

Impervious watershed runoff is computed based on a Curve Number of 98 and a user input impervious area in square feet. AWM does not allow the Curve Number for this watershed type to be changed. If a different Curve Number is desired, the AWM computation should be made using the pervious watershed category or by using a method outside the program.

Pervious watershed runoff is computed on the basis of a user-input Curve Number and watershed area in acres. Feedlots having a manure pack should use this method. The user can enter a 1 day curve number and click the (1-day) radio button and the program will convert the 1 day curve entered to a 30 day curve number. The 30 day curve number computed from the 1 day curve number may be viewed by passing the mouse pointer over the (1-day) radio button. If the user enters a 30 day curve number and clicks on the (30-day) radio button, the program will use the curve number as entered to compute the runoff volumes.

AWM computes runoff by first converting the 1-day Curve Number to a 30-day Curve Number using the following equation:

$CN_{30} = CN_1 – (CN_1 – ((CN1^2.365)/631.79) - 15) \log 30$

The equations of the EFH Handbook Chapter 2 revised for a 30 day CN would be:

$S = (1000 / CN_{30}) – 10$ (Rearranged Equation 2-4)

$Q = ((P – 0.2S)^2 / (P + 0.8S))$ (Equation 2-3)

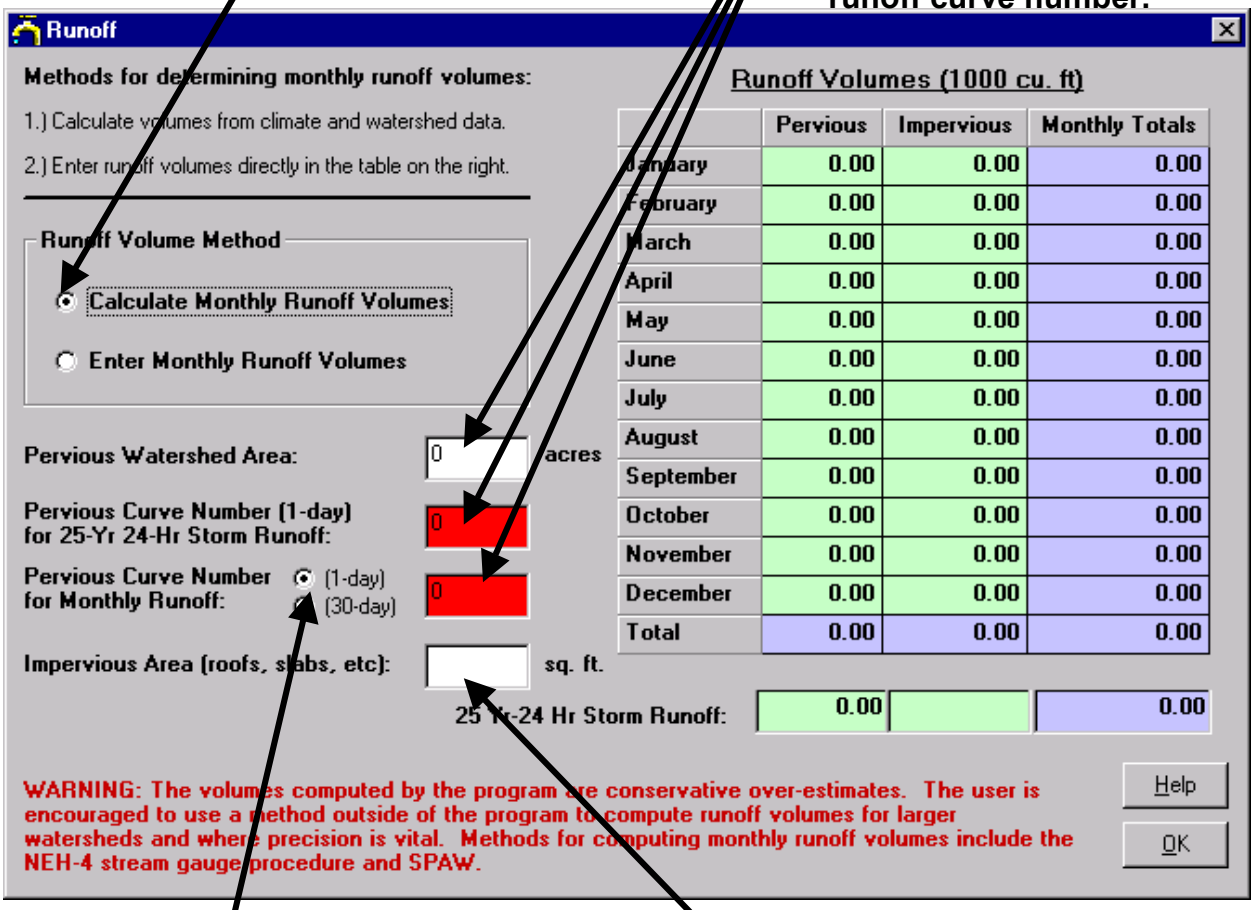
Where: Q = runoff in inches
P = rainfall in inches
S = potential maximum retention after runoff begins in inches

Runoff Screen

The following illustrates the Runoff screen when Calculate Monthly Runoff Volumes radio button is selected.

Click on the Calculate Monthly Runoff Volumes radio button.

Type in the pervious watershed area and the 1-day runoff curve number for the 25Yr-24Hr storm rainfall and the 1-day or 30-day runoff curve number.



If a one day curve number is selected, passing the mouse over the (1-day) will display the 30 day curve number.

Enter the impervious watershed area.

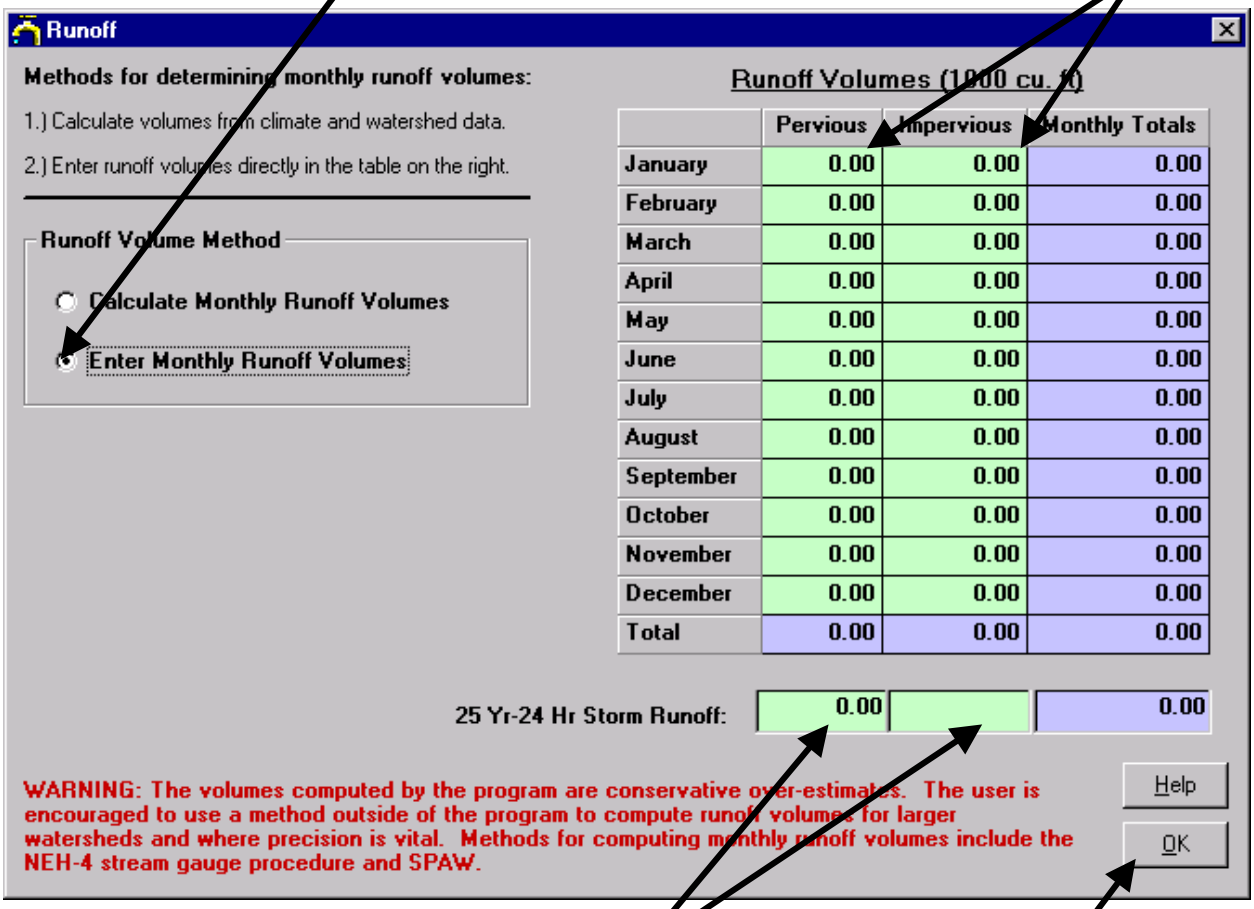
The program will compute the runoff volumes based on the precipitation data and runoff curve numbers entered on the Climate screen.

Runoff Screen

Runoff volumes based on calculations made outside the program may be entered directly into the runoff table. To enter runoff volumes directly, select the Enter Monthly Runoff Volumes button as shown below.

Click on the Enter Monthly Runoff Volumes **radio button.**

Enter monthly runoff as determined by a method outside AWM.



Enter 25-year, 24-hour storm volume as determined by a method outside AWM

Click the OK **button when done editing the Runoff screen.**

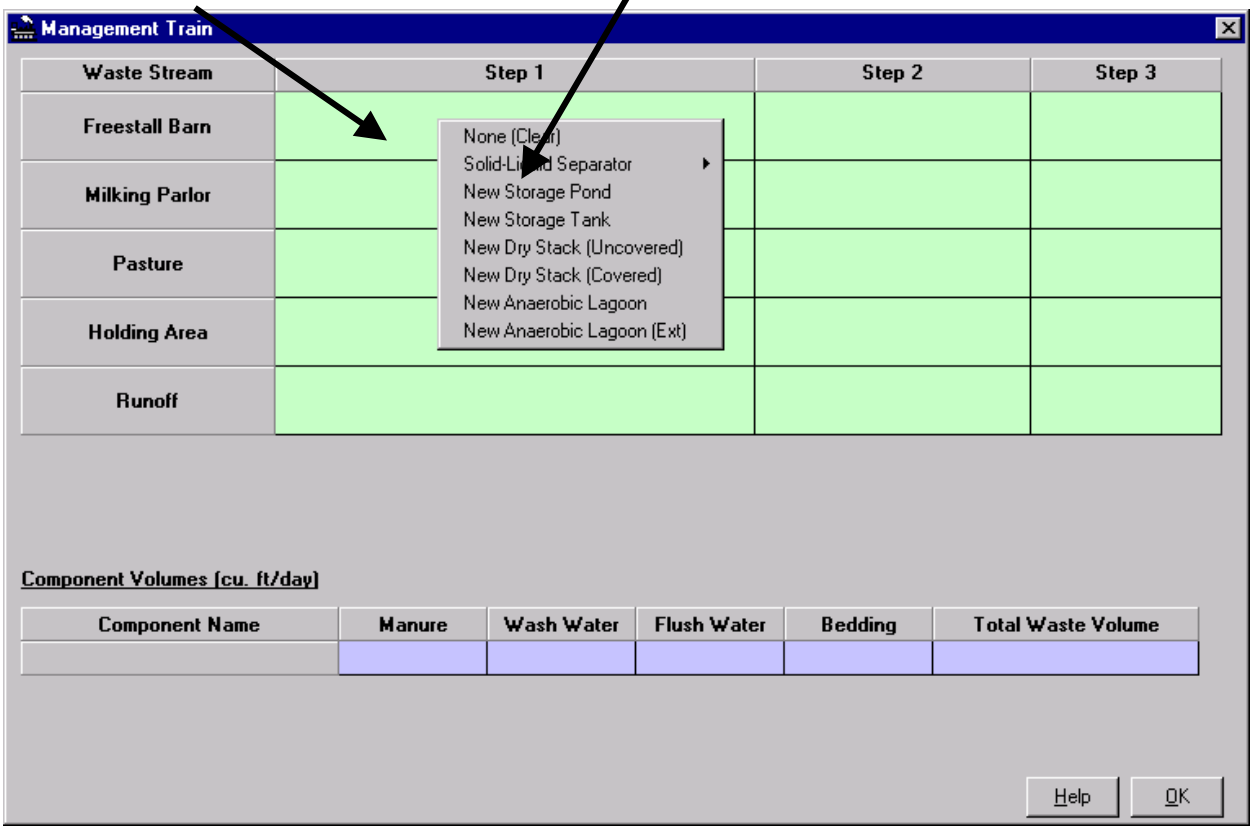
Management Train Screen

The purpose of the Management Train screen is to define the sequence of management components, as described within AWM, for each waste stream developed by the program in the Locations and Additions screens. The sequence of components is described in AWM as management "steps." AWM is capable of evaluating up to three management steps or components for each waste stream. Solid-liquid separator components split a waste stream into two waste streams – solids and liquids. Each of these new waste streams must be followed by appropriate storage components. An uncovered stacking facility requires a liquid storage component, either a pond or a tank, be specified in the next step to store runoff. An anaerobic lagoon with external storage requires that a liquid storage component, either a pond or a tank, be specified in the next step. Multiple waste streams may be directed to a single management component

The following is a blank Management Train screen for a dairy as it would appear when AWM is run for a new waste management system design. The waste stream column lists the wastestreams from (1) locations defined on the Locations screen, (2) any user-defined waste streams, and (3) runoff. Clicking on an input cell will access a drop-down list of available components as illustrated on the screen below.

Click within the input cell to access the drop-down list of available components.

Click on desired component for Step 1 of the waste stream management stream.

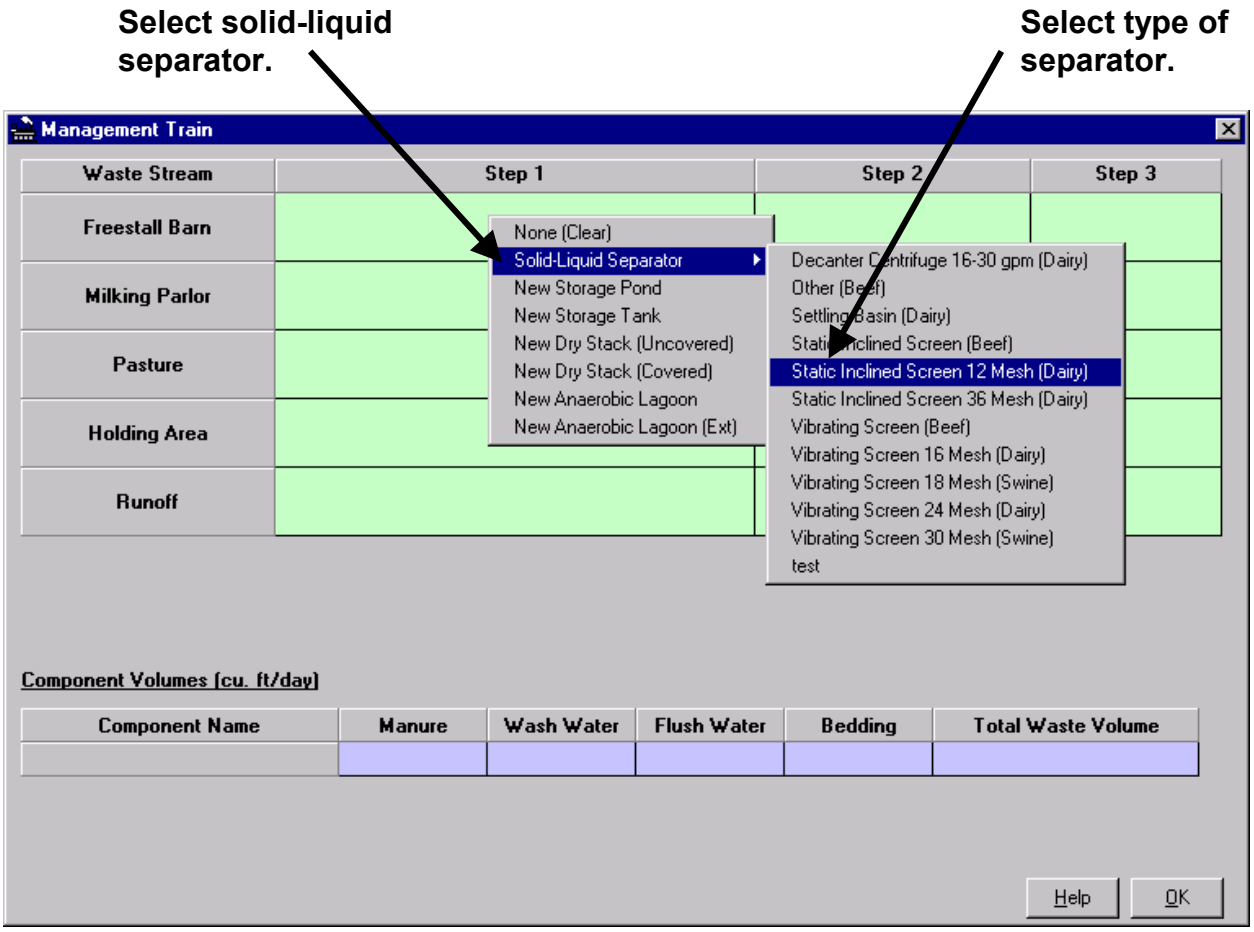


Management Train Screen

A storage pond, storage tank, covered dry stack, or anaerobic lagoon can be a terminal component in the waste management train. However, a solid-liquid separator, uncovered dry stack, and anaerobic lagoon with external storage all require an appropriate subsequent component.

The first time the component drop-down list is accessed, all of the available components will be identified as "new". Once a component is selected for a management step, it will appear on subsequent drop-down lists and is available for use in other waste stream management steps. For example, if "New Storage Pond" is selected for one management step, the next time the drop-down list is accessed this pond will appear as "Storage Pond #1". This pond could then be selected for another waste stream. However, if a second storage pond is desired, "New Storage Pond" would be selected. Subsequent access to drop-down list would identify this pond as "Storage Pond #2."

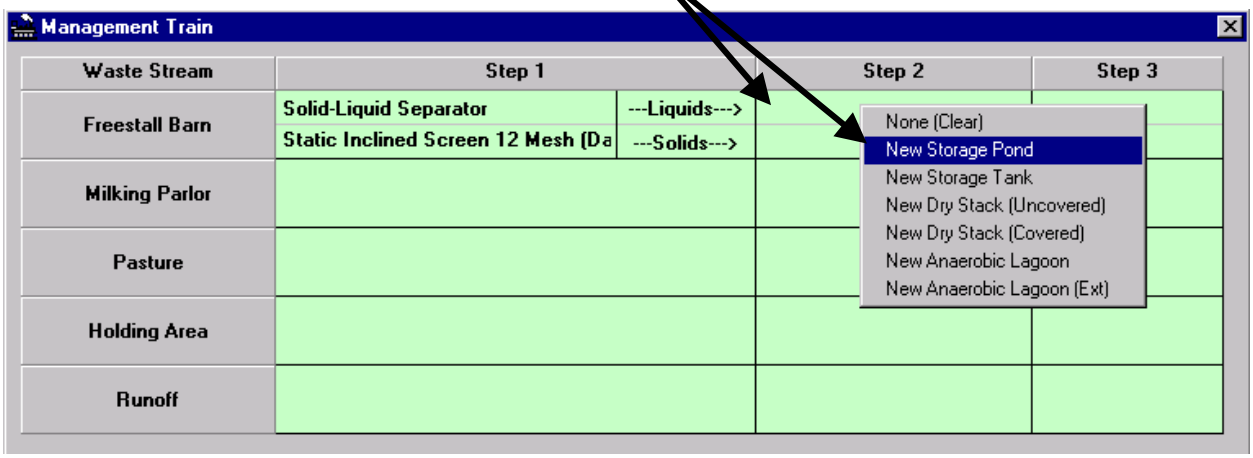
When the "Solid-Liquid Separator" component is selected, another drop-down list is accessed that gives a list of separator types.



Management Train Screen

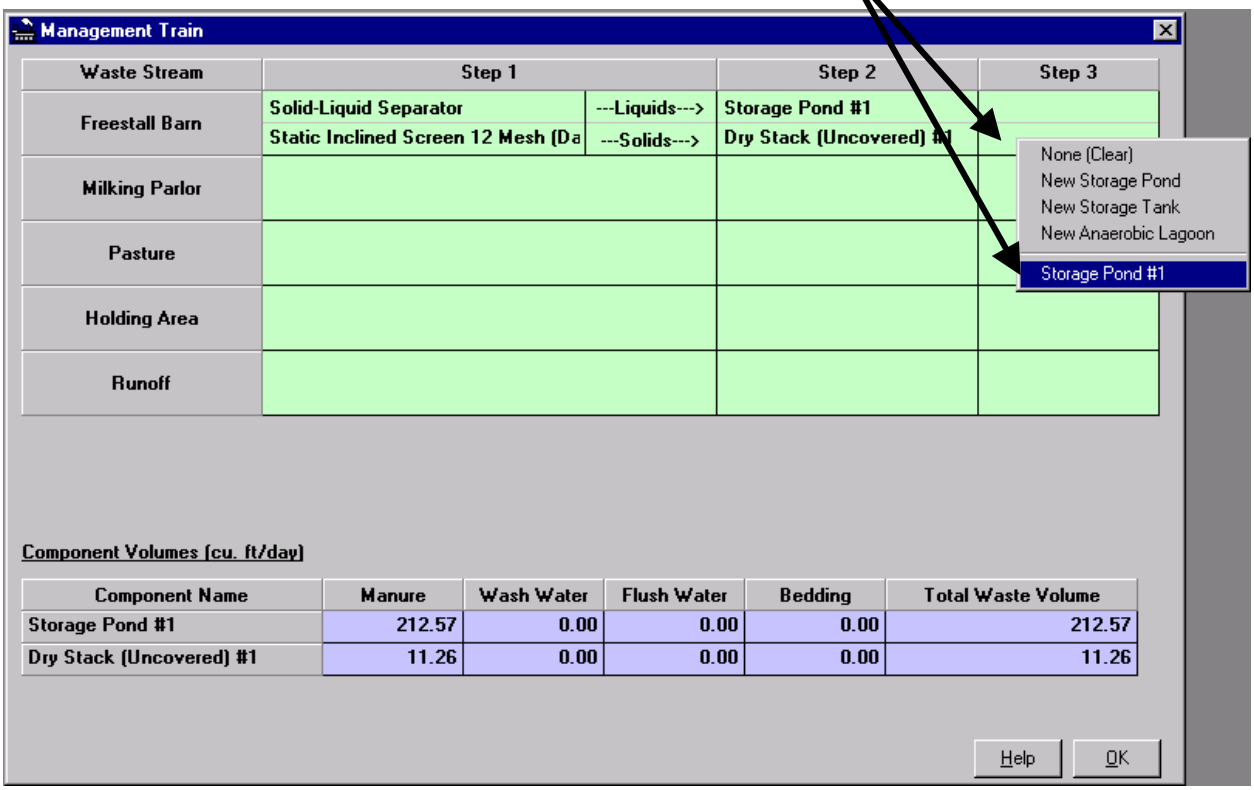
The next step after solid-liquid separation must define the components to which both the solids and liquids will be directed as shown below.

Clicking in the input cell for Step 2, for the example shown below, accesses the drop-down list of components that can be selected as a treatment/storage component for both liquids and solids.



When an uncovered dry stack is selected, an appropriate liquid storage component must be selected in the next step to store its runoff as shown on the screen below.

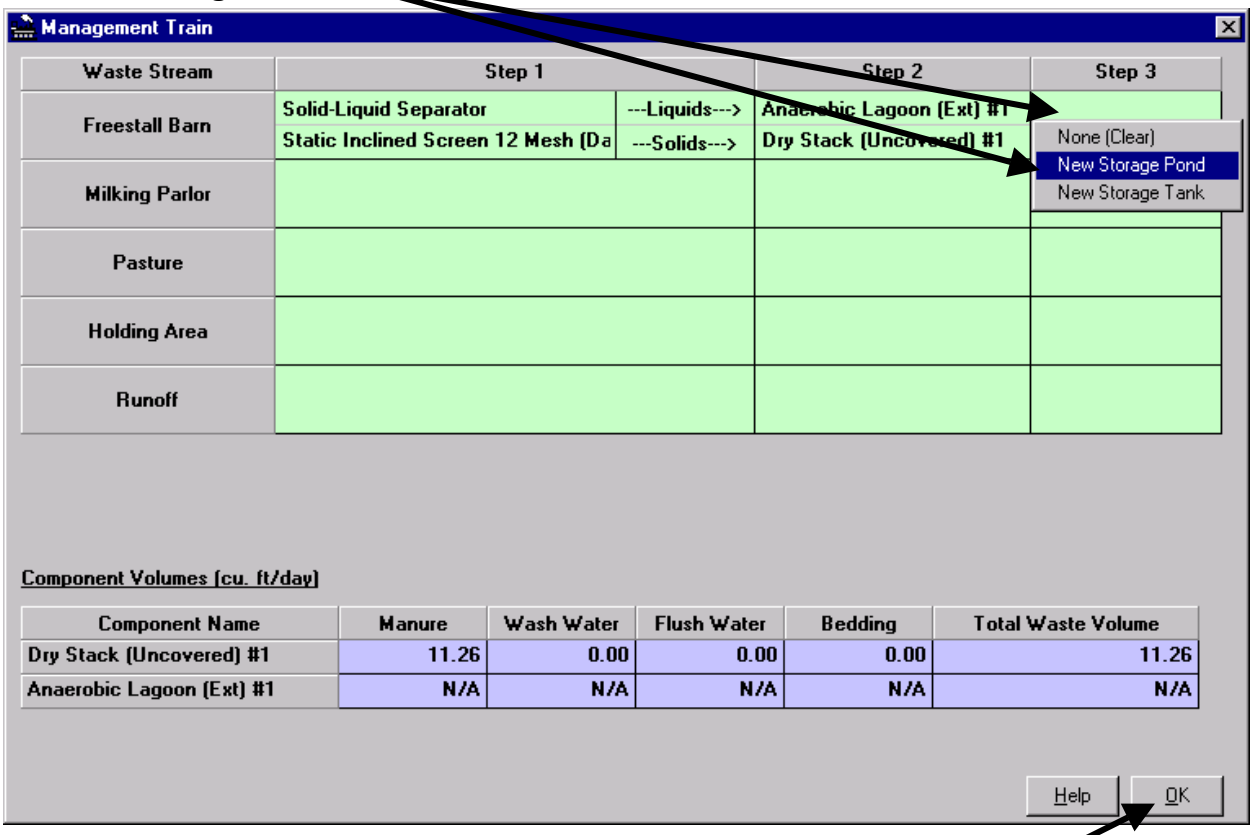
Clicking in the input cell for Step 3, for the example shown below, accesses a drop-down list of components that can be selected to store runoff from the uncovered dry stack's facility.



Management Train Screen

When an anaerobic lagoon with external storage is selected in the management train, it must be followed in the next step with an external storage component as illustrated below:

Clicking in the input cell for Step 3, in the example shown on the screen below, accesses a drop-down list of storage components that can be selected to store effluent from the anaerobic lagoon.

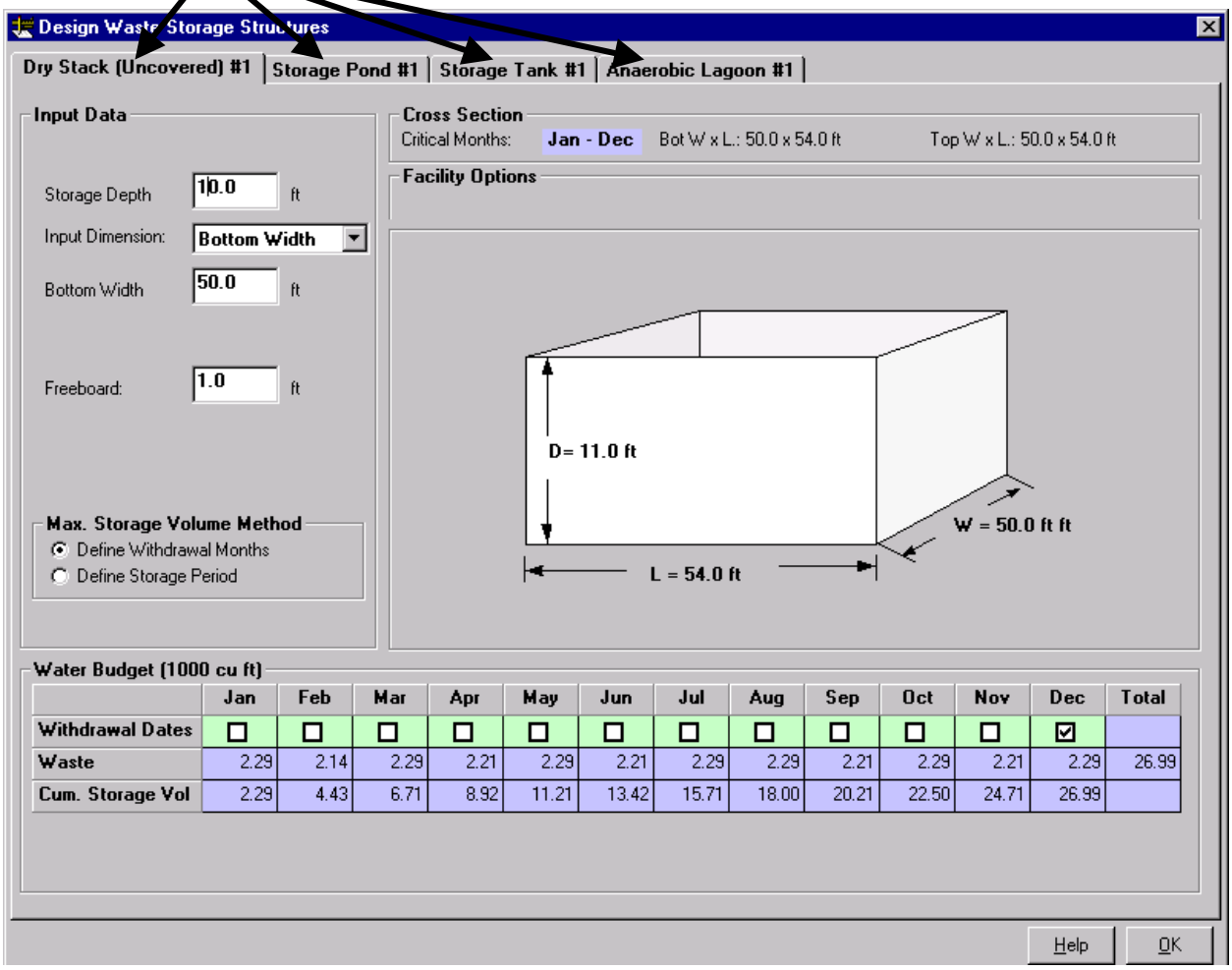


Click the OK button when done editing the Management Train screen.

Design Screen

The Design screen will reveal tabs for each of the components (except solid-liquid separation) selected on the Management Train screen as shown below.

Click on a Tab for the component to access the design screen.



Design Screen

Dry Stack Design (Covered and Uncovered)

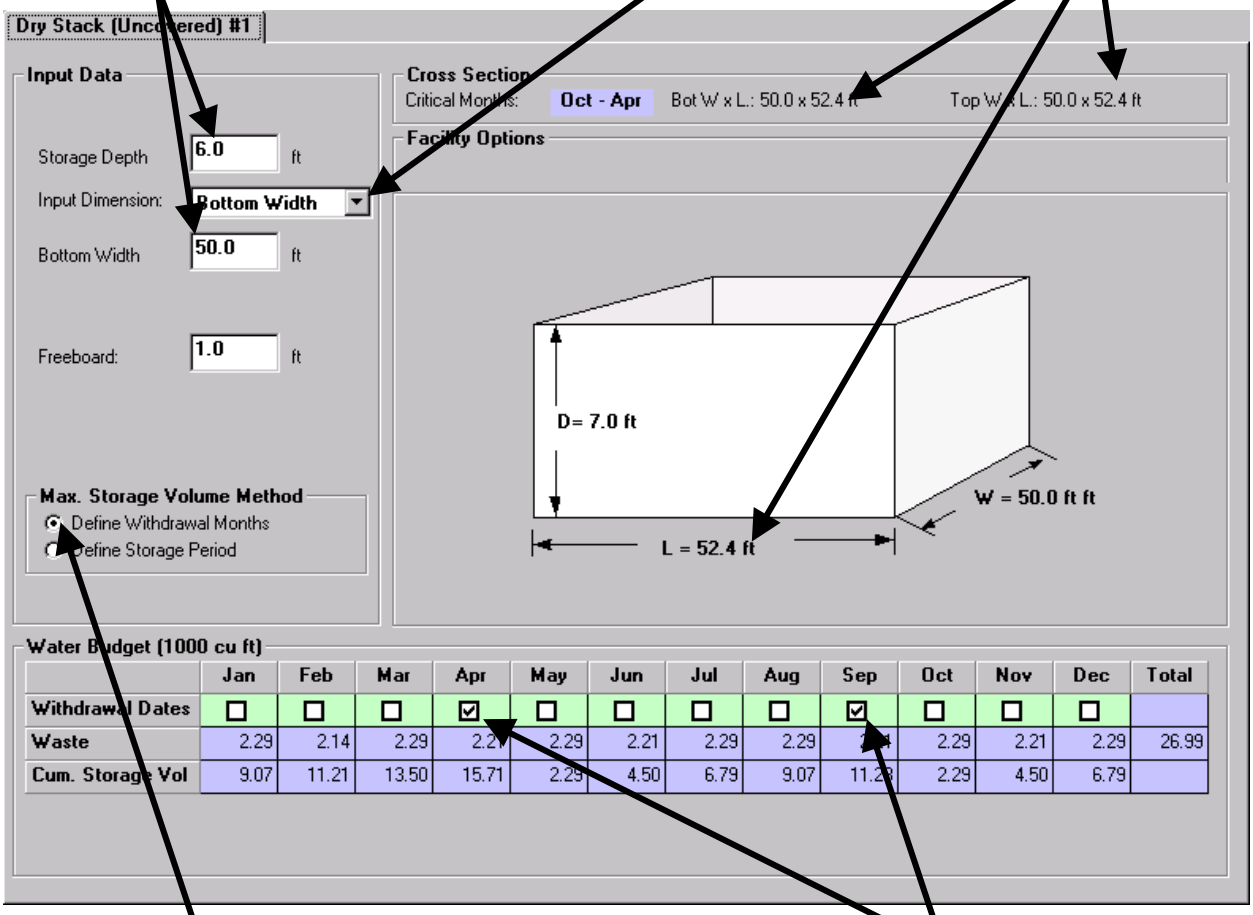
The AWM design of dry stacks is the same for both uncovered and covered stacks with the exception that the precipitation falling on an uncovered dry stack is directed to a waste storage pond or tank. Therefore, from a sizing standpoint, both covered and uncovered design screens are the same. Even though the design screen for a covered dry stack is illustrated, it applies to uncovered as well.

The following screen illustrates a design based on inputting the bottom width, depth and defining the withdrawal months:

Vary depth and bottom width to accommodate the site and available standard plans.

Click on drop-down list to select Bottom Width **or** Bottom Length **to base design on.**

AWM computed dimensions for the example shown below.



selected for the example shown above.

Click on box to check or uncheck months when withdrawal is planned. Withdrawal is on the last day of the month checked.

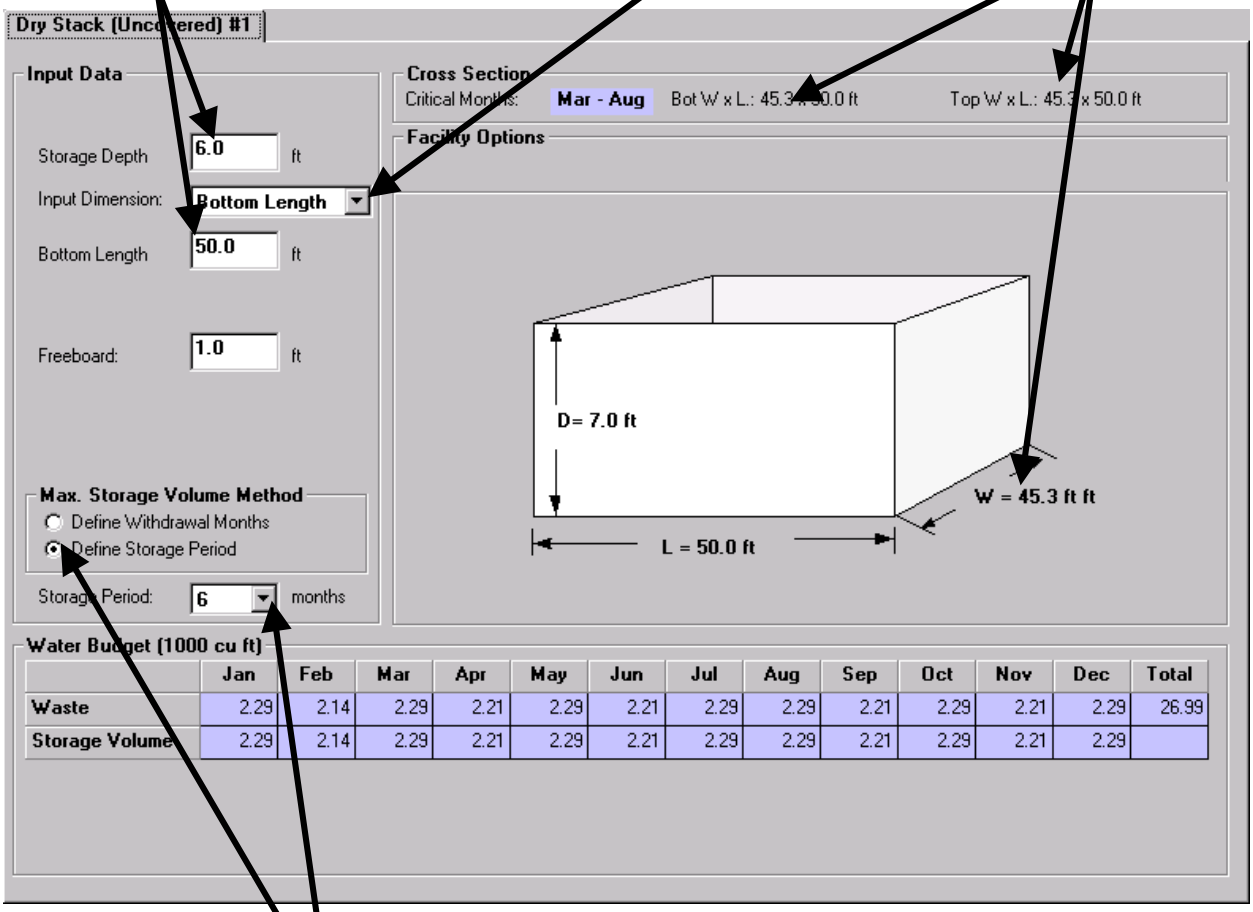
Design Screen

The following screen illustrates a design based on inputting the bottom length, depth and defining the storage period:

Vary depth and bottom length to accommodate the site and available standard plans.

Click on drop-down list to select Bottom Width **or** Bottom Length **dimension to base design on.**

AWM computed dimensions for the example shown.



selected for the example shown. Use the storage period drop-down list to select the number of months to use as the storage period.

Design Screen

Storage Pond Design

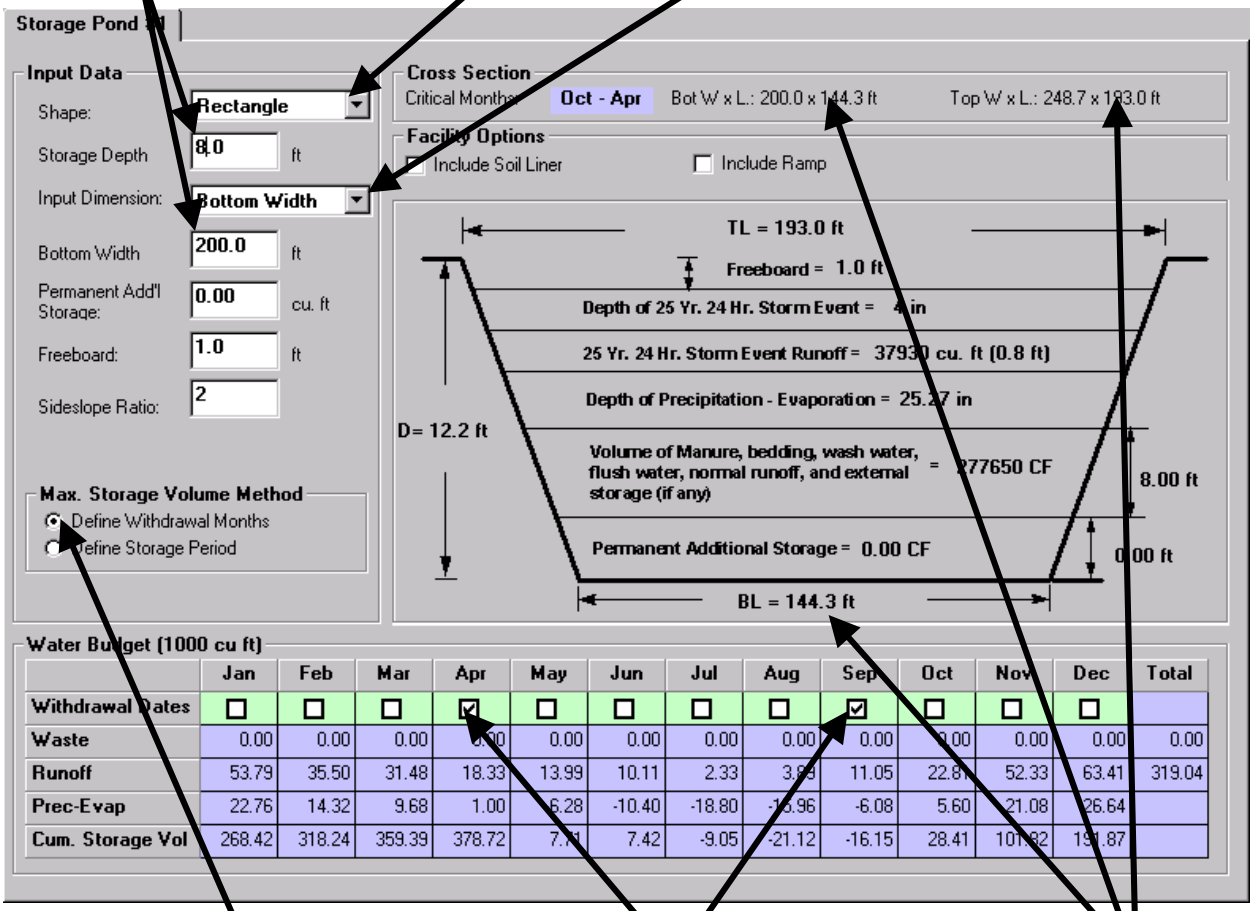
The design of storage ponds in AWM allows the user to define a rectangular or circle type pond. AWM bases the design on the storage depth, bottom width or length, permanent additional storage, freeboard, sideslope ratio and maximum storage volume method inputs made by the user.

The following screen illustrates a rectangular storage pond design based on defining withdrawal months:

Vary depth and bottom length to accommodate the site.

Click on drop-down list to select the shape of the pond to base design on.

Click on drop-down list to select Bottom Width **or** Bottom Length **dimension to base design on.**



Define Withdrawal Months **selected for the example shown.**

Click on box to check or uncheck months when withdrawal is planned. Withdrawal is on the last day of the month checked.

AWM computed dimensions for the example shown.

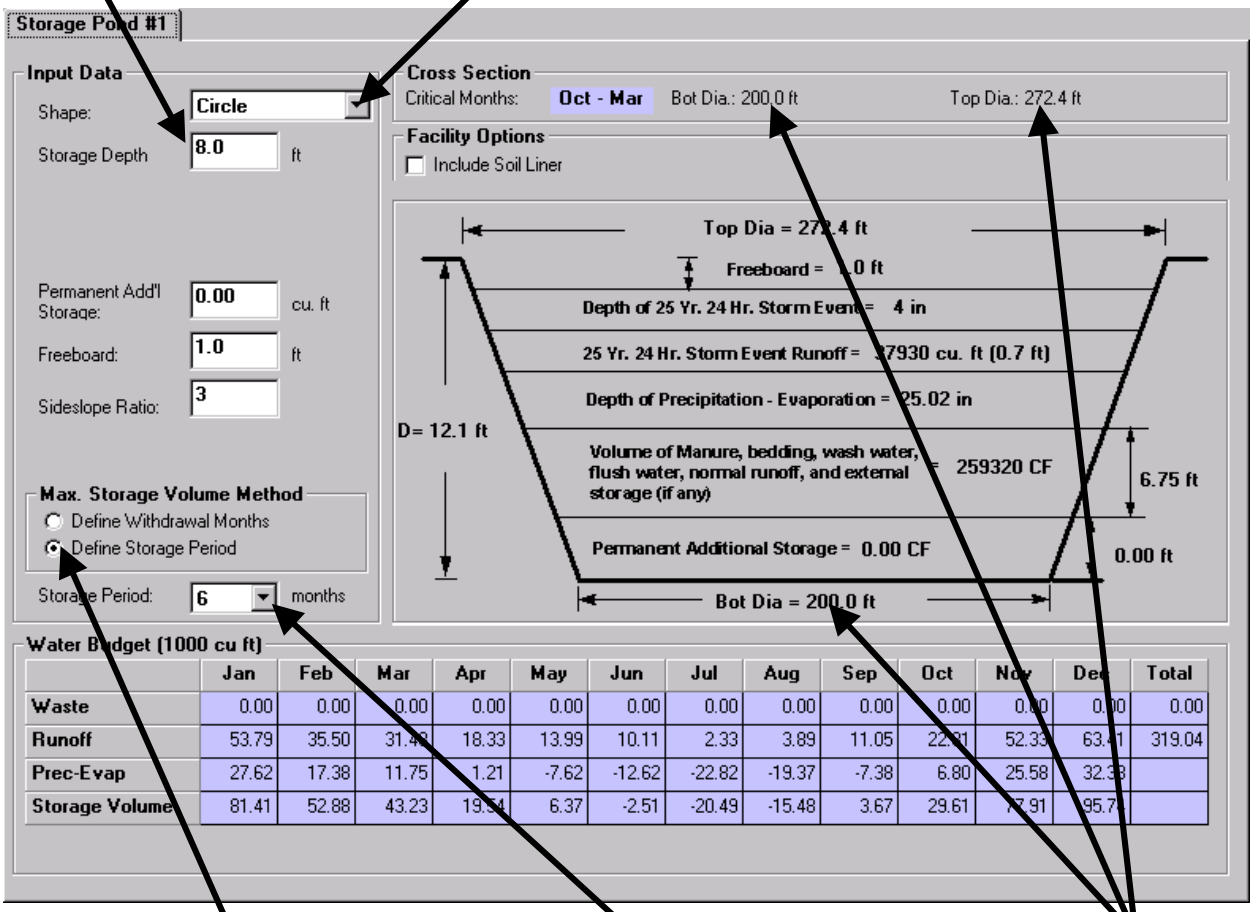
Design Screen

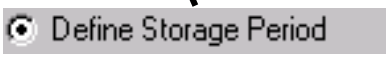
For a storage pond design based on a storage period, AWM determines which set of consecutive months during the year for the storage period specified requires the greatest storage volume and sizes the facility accordingly.

The following screen illustrates a circular storage pond design based on defining a storage period:

Vary depth to accommodate the site.

Click on drop-down list to select shape of the pond to base the design on.





option selected for the example shown.

Click on drop-down list to access a list of months(1-12) to select a storage period.

AWM computed dimensions for the example shown.

Storage depth is the total depth of the pond less freeboard, depth of 25-yr., 24-hr. precipitation, depth of 25-yr., 24-hr. storm event runoff, and depth of precipitation less evaporation option selected on the Climate screen. Permanent additional Storage may be required to meet management goals or regulatory requirements (see NRCS Practice Standard 313, Waste Storage Facility).

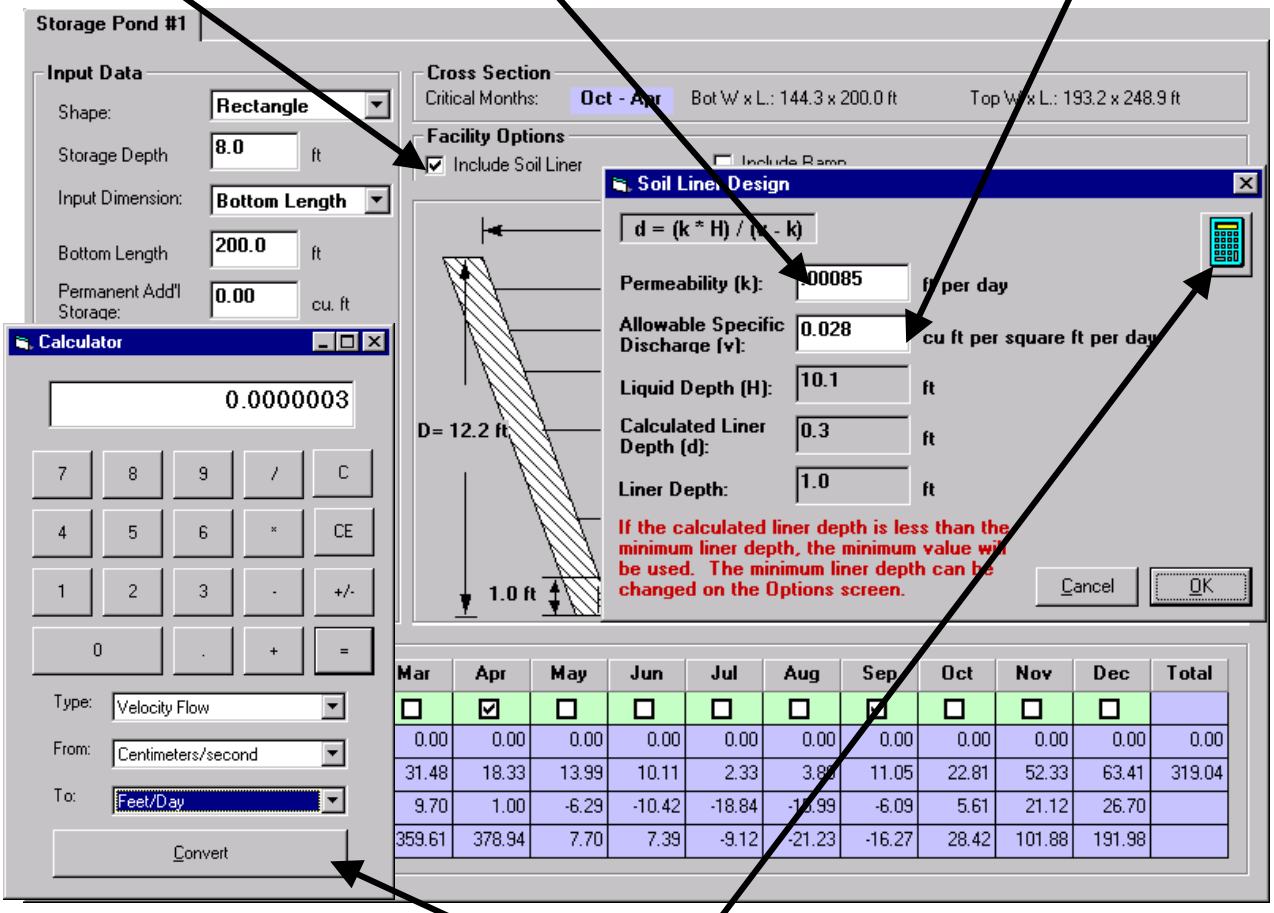
Design Screen

The following screen illustrates the soil liner design option for a storage pond:

Click on Include Soil Liner **to access the soil liner design screen.**

Enter the permeability of the soil to be used for the liner. This value is normally available from the soil mechanics report.

Enter the allowable specific discharge. This value may be based on regulatory requirements.



Click on  **to access the conversion calculator. The calculator can be used to convert centimeters per second to feet per day. See the Calculator section in this chapter for more information.**

The liquid depth AWM uses for designing the soil liner is based on the total depth of the pond less freeboard, depth of 25-yr., 24-hr. precipitation, and the depth of the 25-yr., 24-hr. storm event runoff.

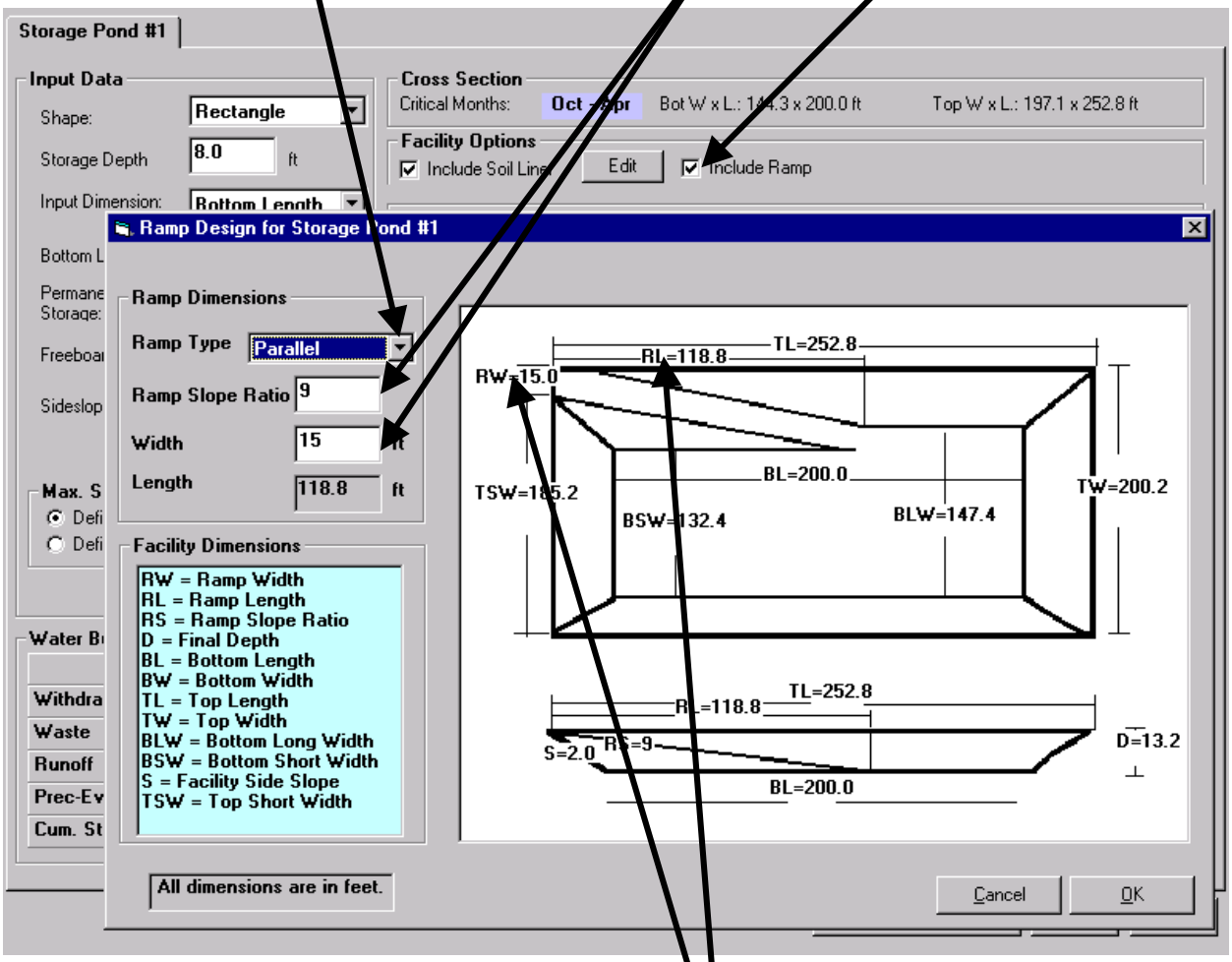
Design Screen

The following screen illustrates the parallel ramp design option for a storage pond:

Click on the drop-down list to select the type of ramp to design. Choices are Parallel and Perpendicular.

Enter the preferred slope ratio and width of the ramp.

Click on Include Ramp **to access the ramp design screen.**



AWM computes the length of the ramp and shows the dimensions of the ramp on the schematic drawing of the storage pond.

The parallel ramp design screen is not available for circular ponds.

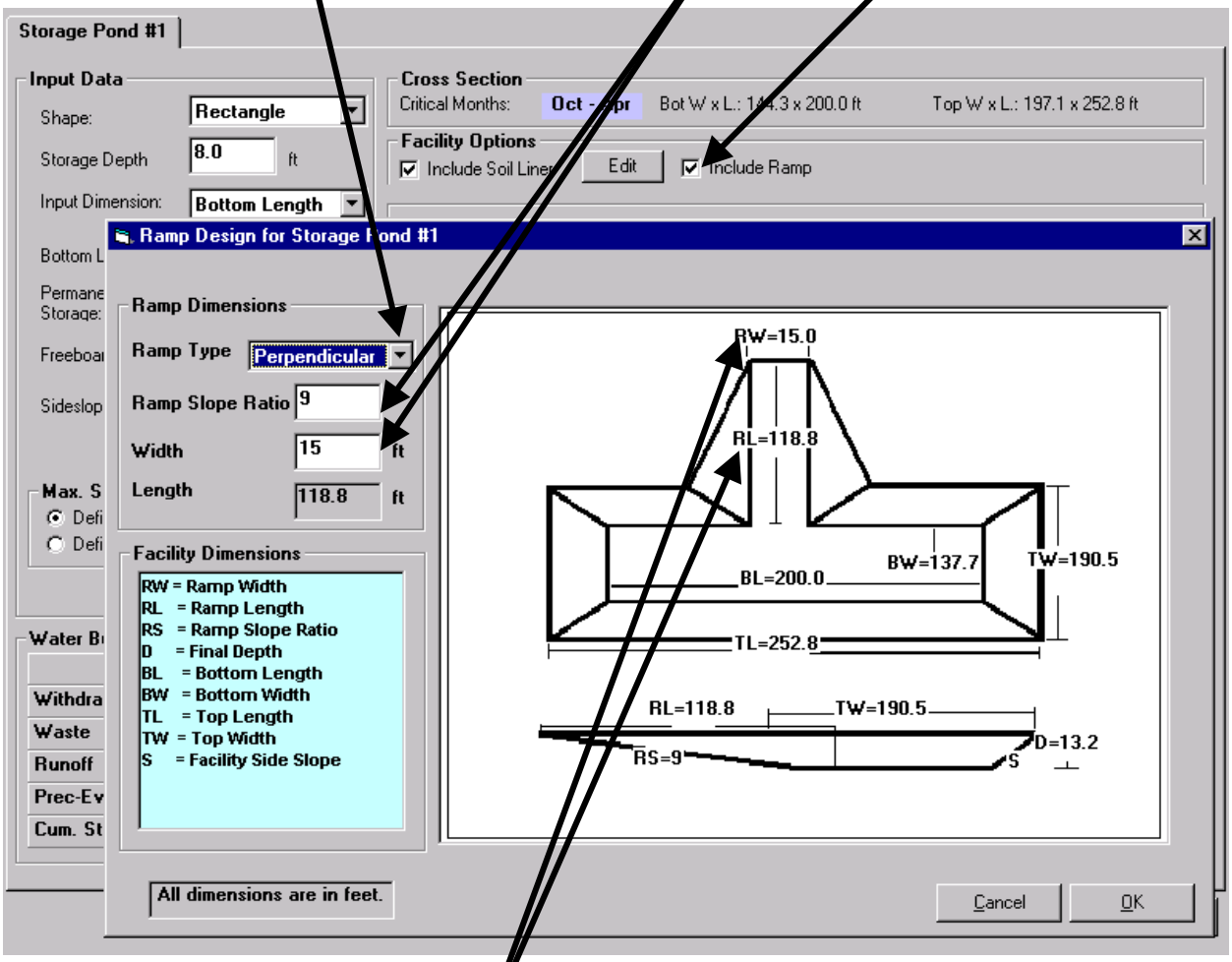
Design Screen

The following screen illustrates the perpendicular ramp design option for a storage pond:

Click on the drop-down list to select the type of ramp to design. Choices are Parallel and Perpendicular.

Enter the preferred slope ratio and width of the ramp.

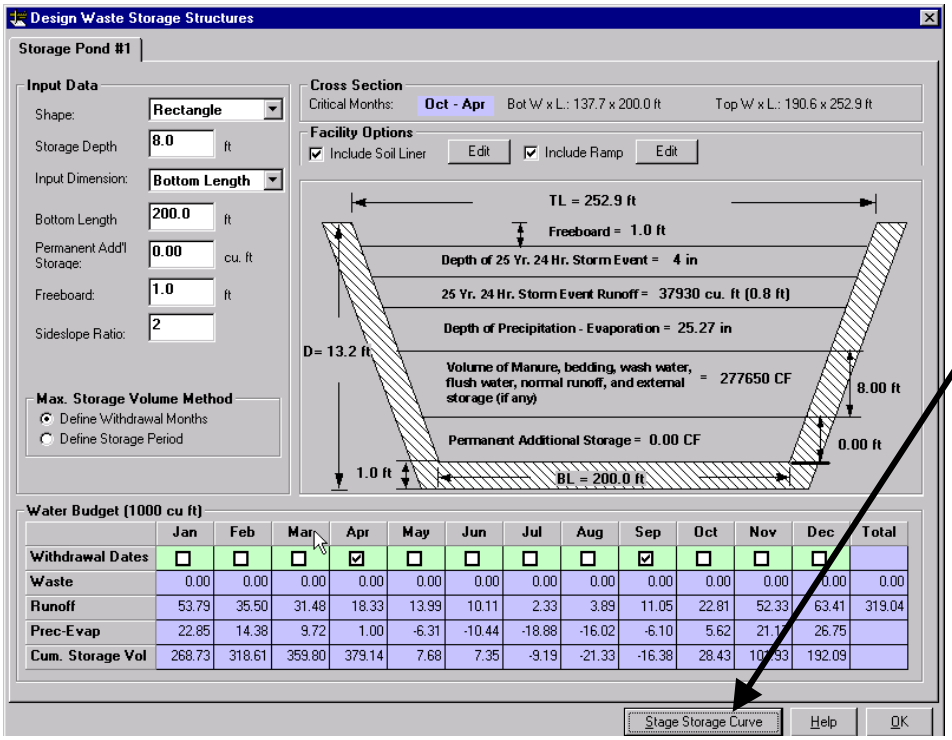
Click on Include Ramp **to access the ramp design screen.**



AWM computes the length of the ramp and shows the dimensions of the ramp on the schematic drawing of the storage pond.

The perpendicular ramp design screen is not available for circular ponds.

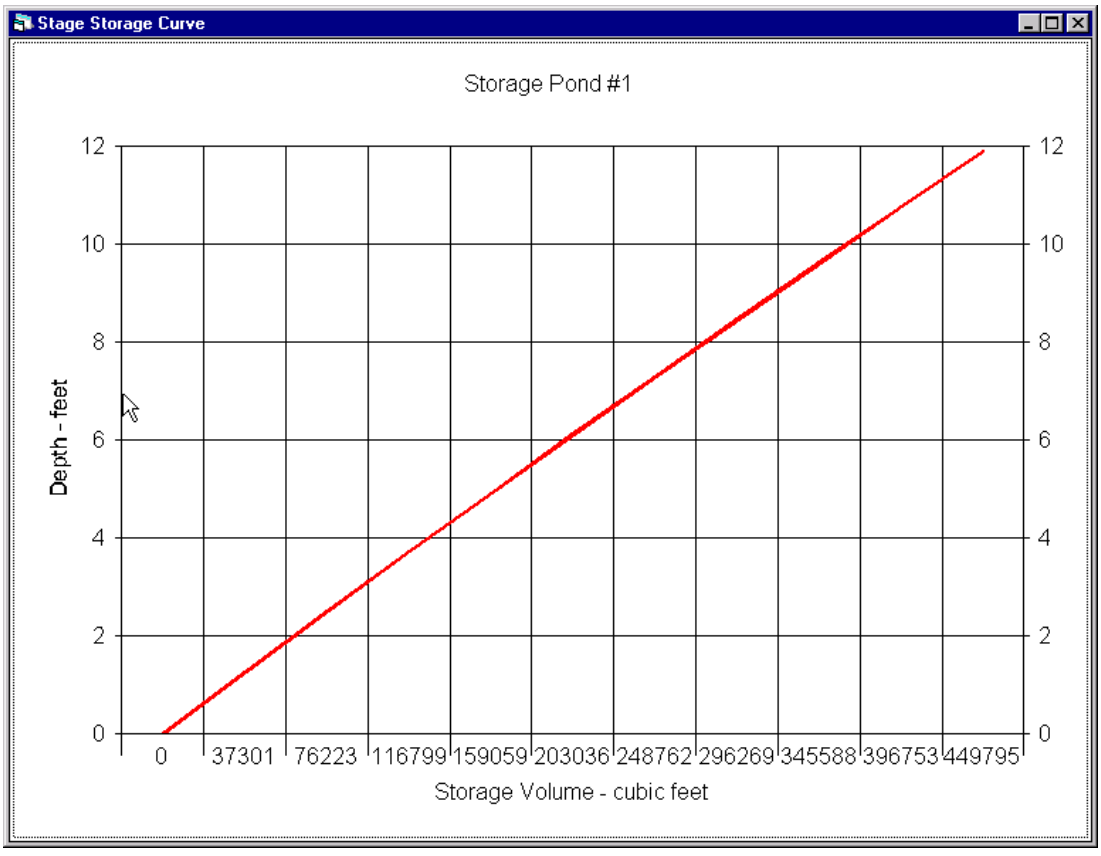
Design Screen



Click on

button to access the stage storage curve for the storage pond design.

The following screen illustrates the stage storage curve for the example storage pond design:

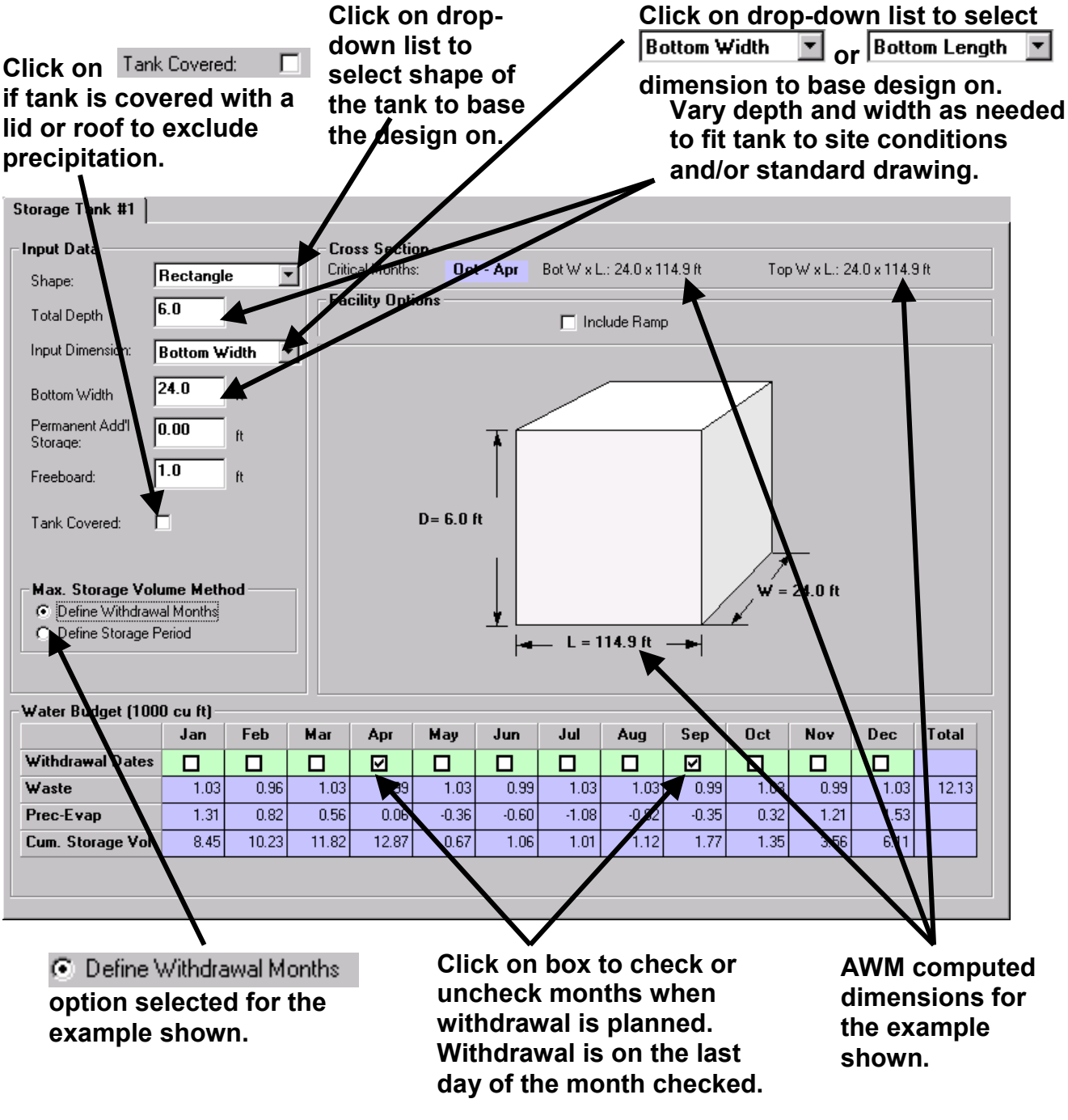


Design Screen

Storage Tank Design

The design of tanks in AWM allows the user to define a rectangular or circular type tank. AWM bases the design on the storage depth, bottom width or length, permanent additional storage, freeboard, precipitation excluded or not and maximum storage volume method inputs made by the user.

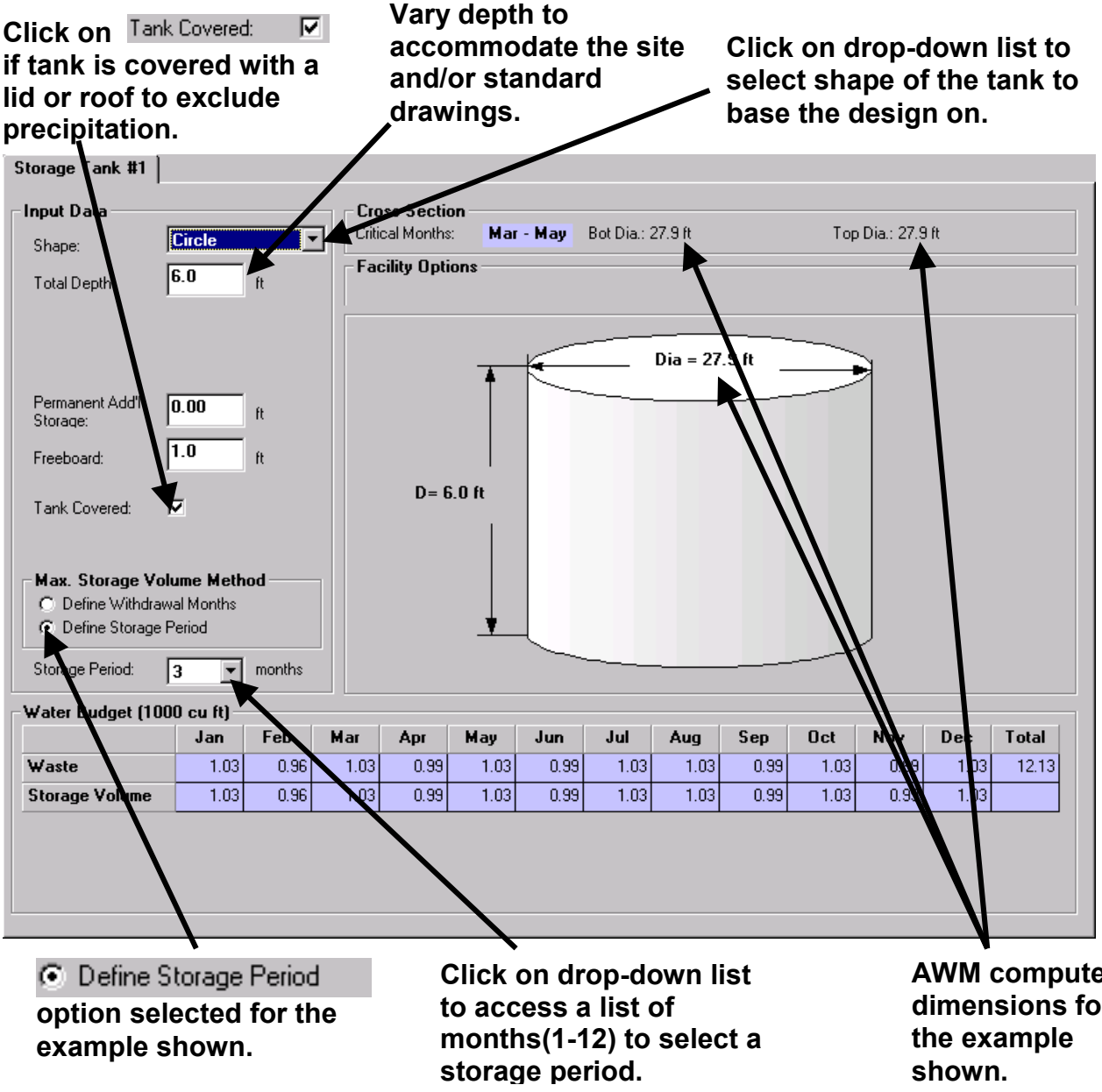
The following screen illustrates a rectangular tank design based on defining withdrawal months:



Design Screen

For a tank design based on a storage period, AWM determines which set of consecutive months during the year for the storage period specified requires the greatest storage volume and sizes the facility accordingly.

The following screen illustrates a circular tank design based on defining a storage period and excluding precipitation:



Storage depth for covered tanks excludes depth of 25-yr., 24-hr. precipitation and depth of precipitation less evaporation option selected on the Climate screen. Permanent additional Storage may be required to meet management goals or regulatory requirements (see NRCS Practice Standard 313, Waste Storage Facility). Passing the mouse pointer over Permanent Add'l Storage: will generate a popup box that shows the cubic feet of storage associated with the depth of additional storage entered.

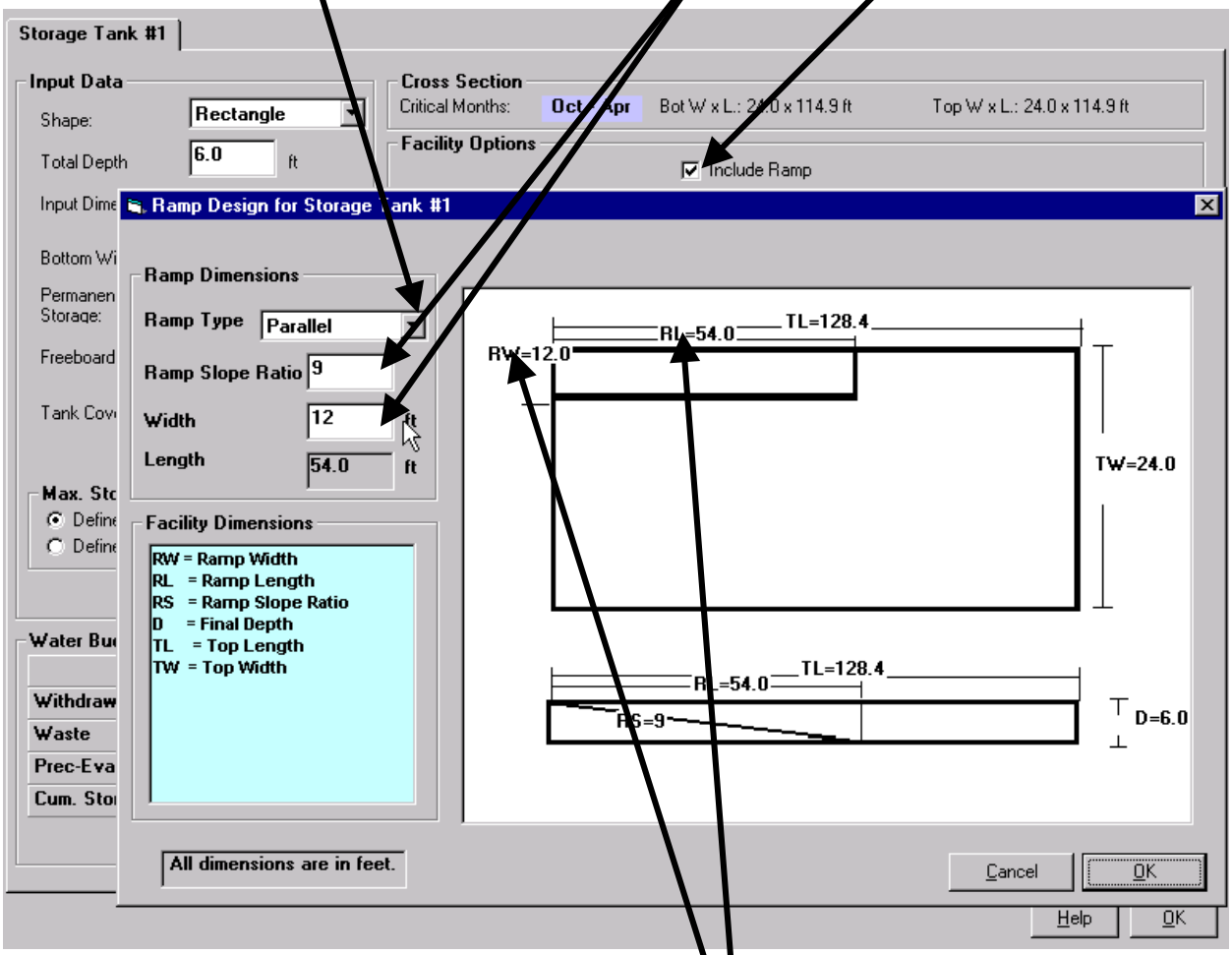
Design Screen

The following screen illustrates the parallel ramp design option for a rectangular tank:

Click on the drop-down list to select the type of ramp to design. Choices are Parallel and Perpendicular.

Enter the preferred slope ratio and width of the ramp.

Click on Include Ramp **to access the ramp design screen.**



AWM computes the length of the ramp and shows the dimensions of the ramp on the schematic drawing of the rectangular tank.

The parallel ramp design screen is not available for circular tanks.

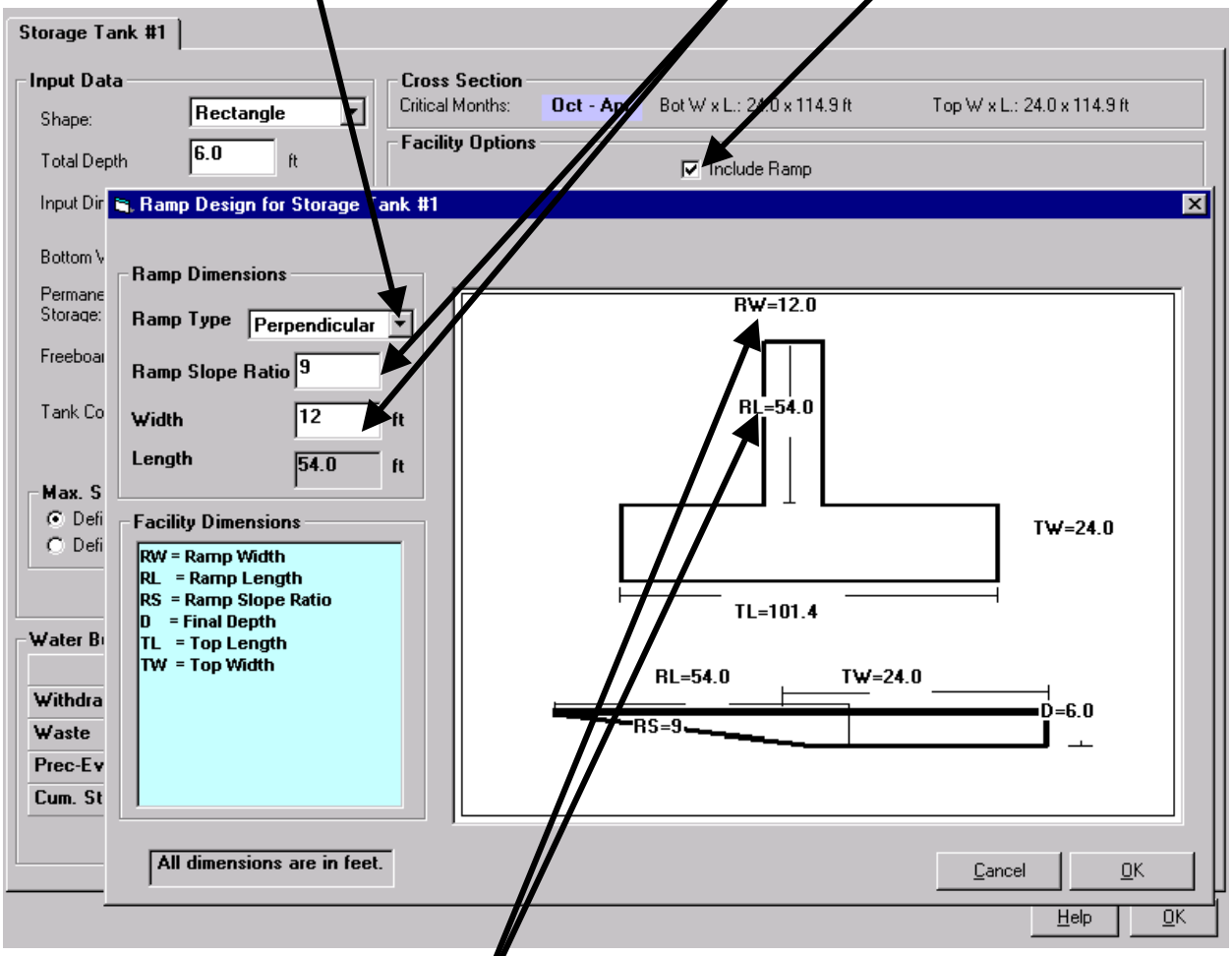
Design Screen

The following screen illustrates the perpendicular ramp design option for a rectangular tank:

Click on the drop-down list to select the type of ramp to design. Choices are Parallel and Perpendicular.

Enter the preferred slope ratio and width of the ramp.

Click on Include Ramp **to access the ramp design screen.**



AWM computes the length of the ramp and shows the dimensions of the ramp on the schematic drawing of the rectangular tank.

The perpendicular ramp design screen is not available for circular tanks.

Design Screen

Anaerobic Lagoon Design

The inputs for the design of anaerobic lagoons in AWM are very similar to the design of a storage pond. AWM allows the user to define a rectangular or oval type lagoon. AWM bases the design on the storage depth, bottom width or length, permanent additional storage, freeboard, sideslope ratio, sludge accumulation period and maximum storage volume method inputs made by the user.

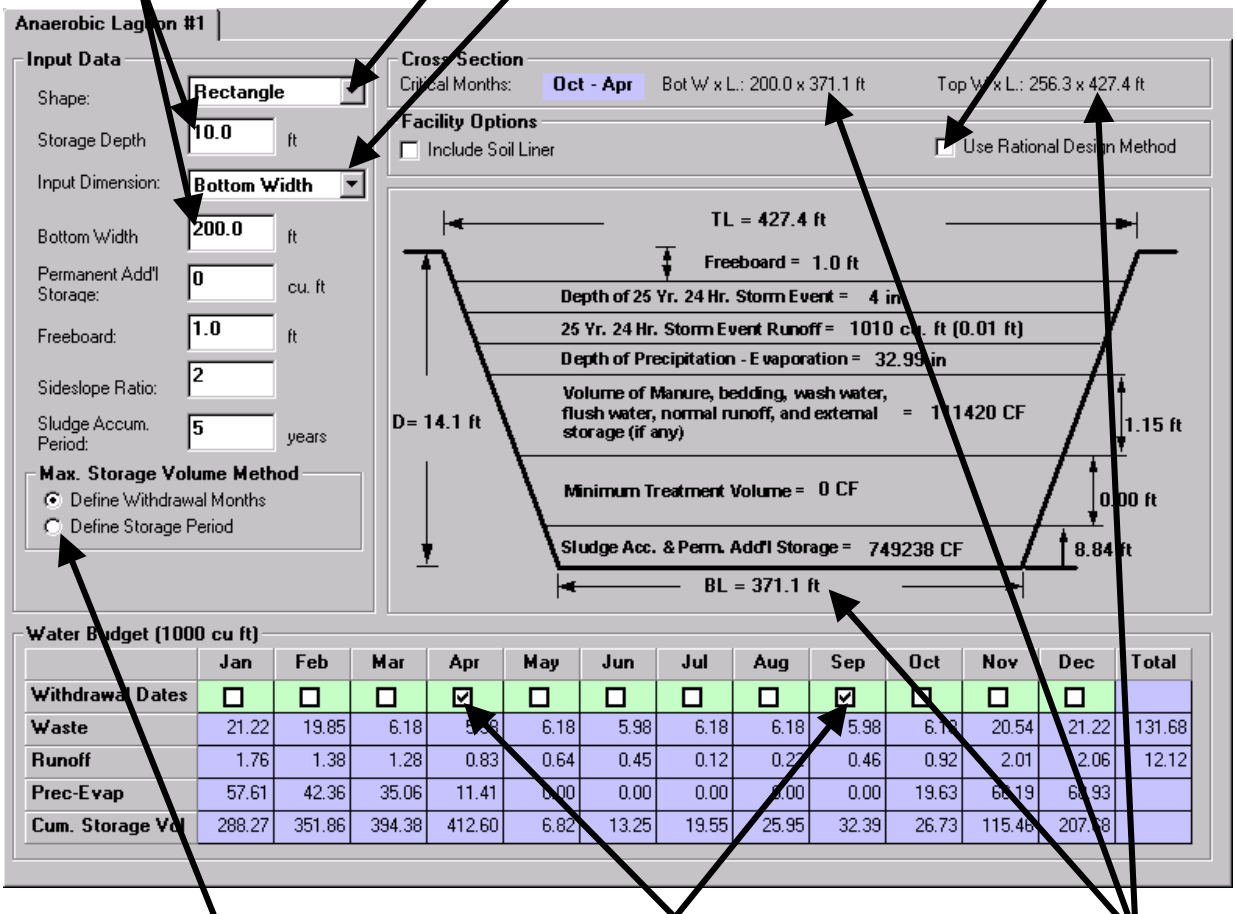
The following screen illustrates a rectangular anaerobic lagoon design based on defining withdrawal months:

Vary depth and bottom width to accommodate the site.

Click on drop-down list to select the shape of the lagoon to base design on. Choices are rectangular and circular.

Click on drop-down list to select Bottom Width **or** Bottom Length **dimension to base design on.**

The NRCS design methodology is used unless the Use Rational Design Method **is checked..**



selected for the example shown.

Click on box to check or uncheck months when withdrawal is planned. Withdrawal is on the last day of the month checked.

AWM computed dimensions for the example shown.

Design Screen

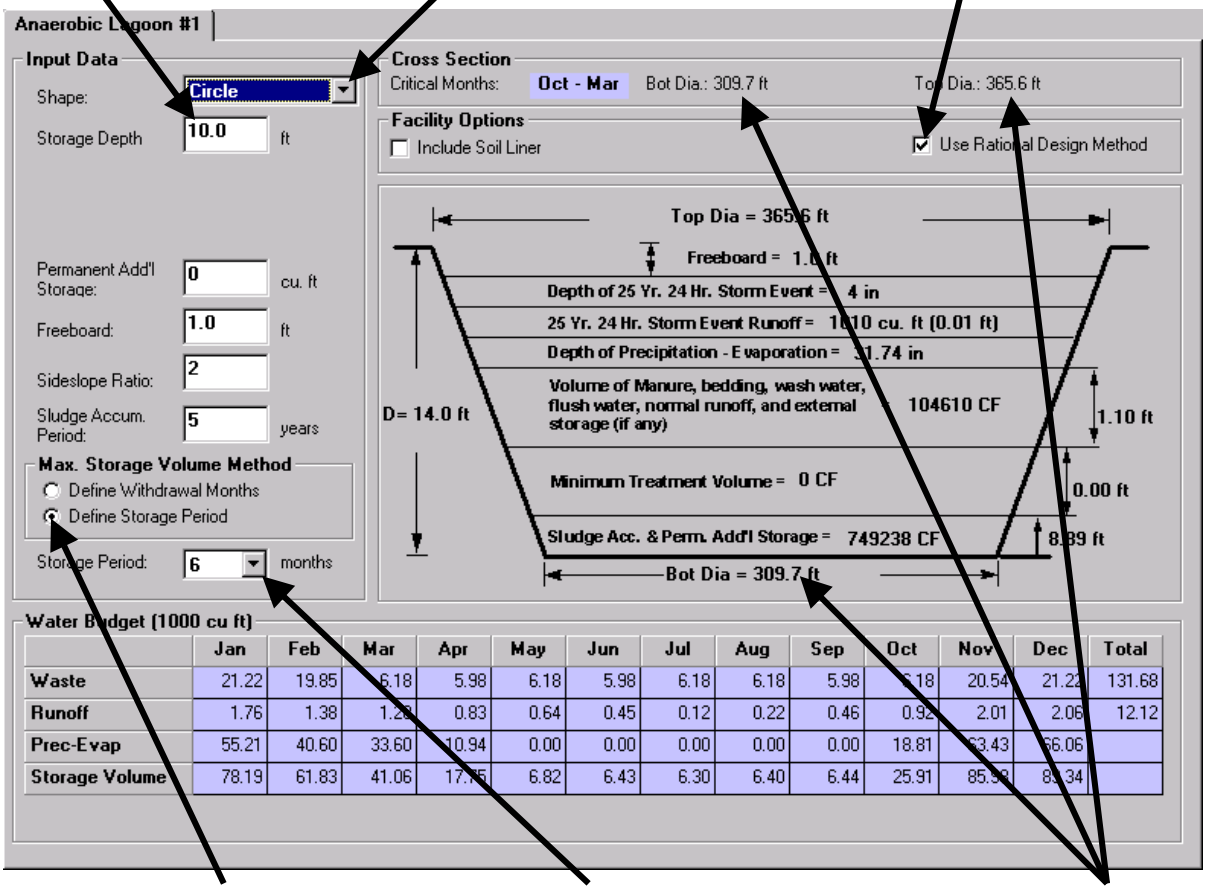
For an anaerobic lagoon design based on a storage period, AWM determines which set of consecutive months during the year for the storage period specified requires the greatest storage volume and sizes the facility accordingly.

The following screen illustrates a circular anaerobic lagoon design based on defining a storage period and using the Rational Design Method:

Vary depth to accommodate the site.

Click on drop-down list to select shape of the lagoon to base the design on. Choices are Rectangular and Circular.

The NRCS design methodology is used unless the Use Rational Design Method **is checked.**



Define Storage Period **option selected for the example shown.**

Click on drop-down list to access a list of months(1-12) to select a storage period.

AWM computed dimensions for the example shown.

Storage depth is the total depth of the pond less freeboard, depth of 25-yr., 24-hr. precipitation, depth of 25-yr., 24-hr. storm event runoff, and depth of precipitation less evaporation option selected on the Climate screen. Permanent additional Storage may be required to meet management goals or regulatory requirements (see NRCS Practice Standard 359, Waste Treatment Lagoon). At least 1 year of sludge accumulation period should be entered to account for sludge buildup in the lagoon.

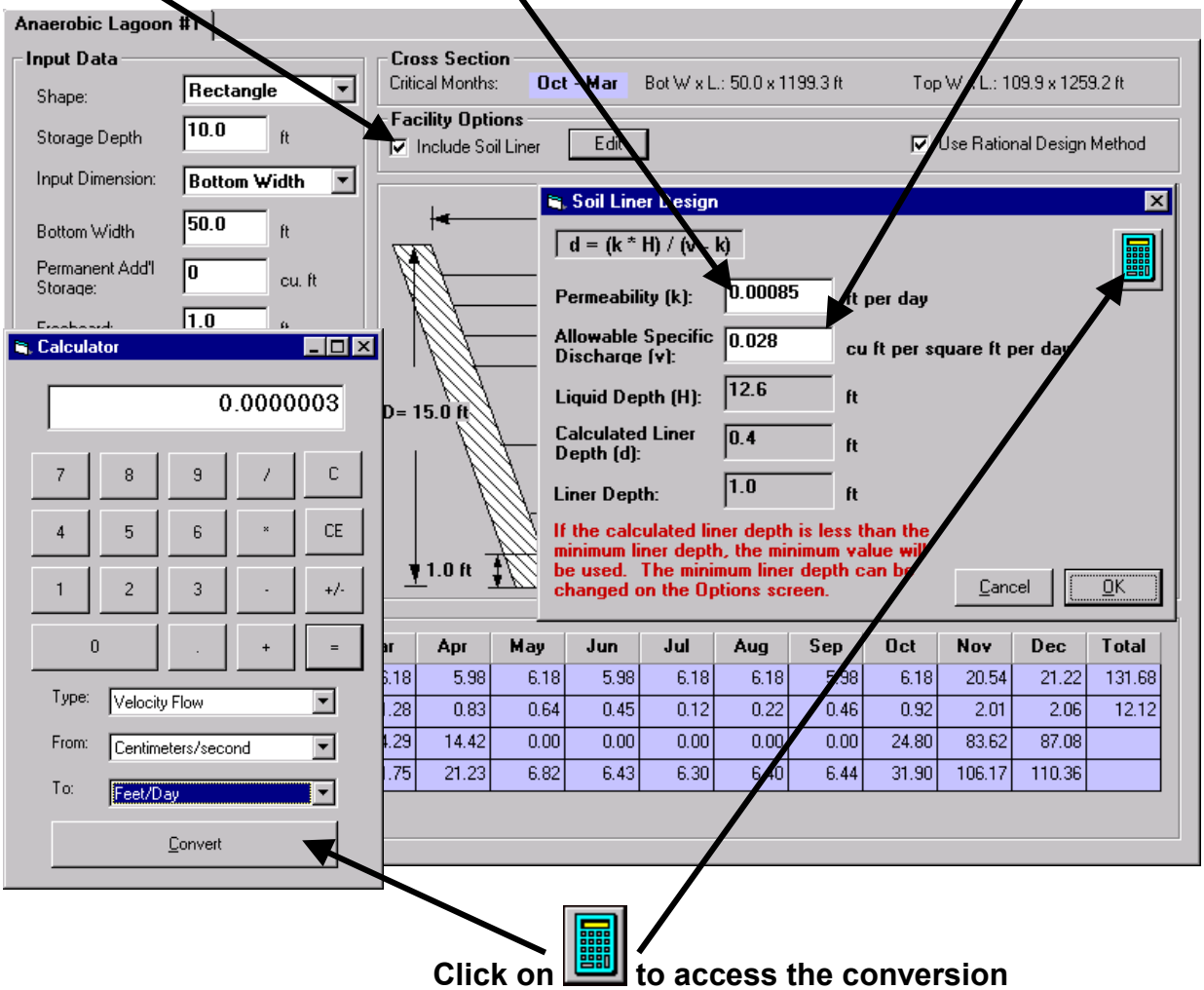
Design Screen

The following screen illustrates the soil liner design option for an anaerobic lagoon:

Click on Include Soil Liner **to access the soil liner design screen.**

Enter the permeability of the soil to be used for the liner. This value is normally available from the soil mechanics report.

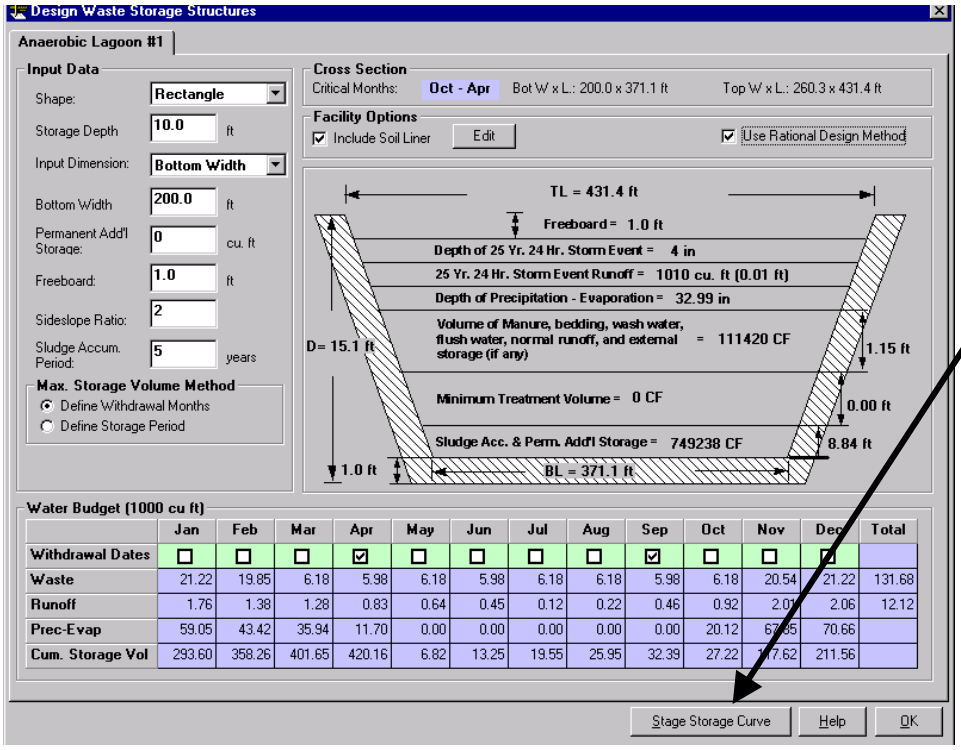
Enter the allowable specific discharge. This value may be based on regulatory requirements.



Click on **to access the conversion calculator. The calculator can be used to convert centimeters per second to feet per day. See the Calculator section in this chapter for more information.**

The liquid depth AWM uses for designing the soil liner is based on the total depth of the lagoon less freeboard, depth of 25-yr., 24-hr. precipitation, and the depth of the 25-yr., 24-hr. storm event runoff.

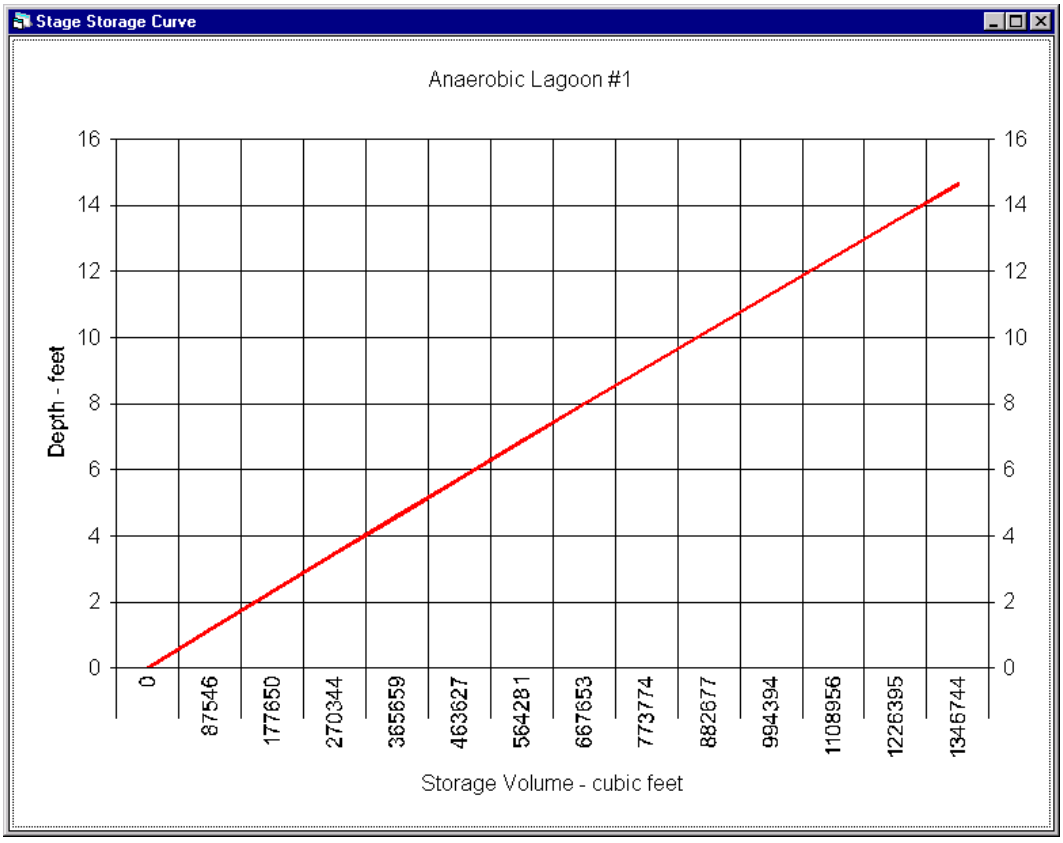
Design Screen



Click on

button to access the stage storage curve for the anaerobic lagoon design.

The following screen illustrates the stage storage curve for the example anaerobic lagoon design:



Design Screen

Anaerobic Lagoon with External Storage

The anaerobic lagoon with external storage design option utilizes an anaerobic lagoon to contain the minimum treatment volume. All other volume requirements are contained in the storage facility that must follow the lagoon in the management train. The only time this lagoon would be emptied would be for sludge removal.

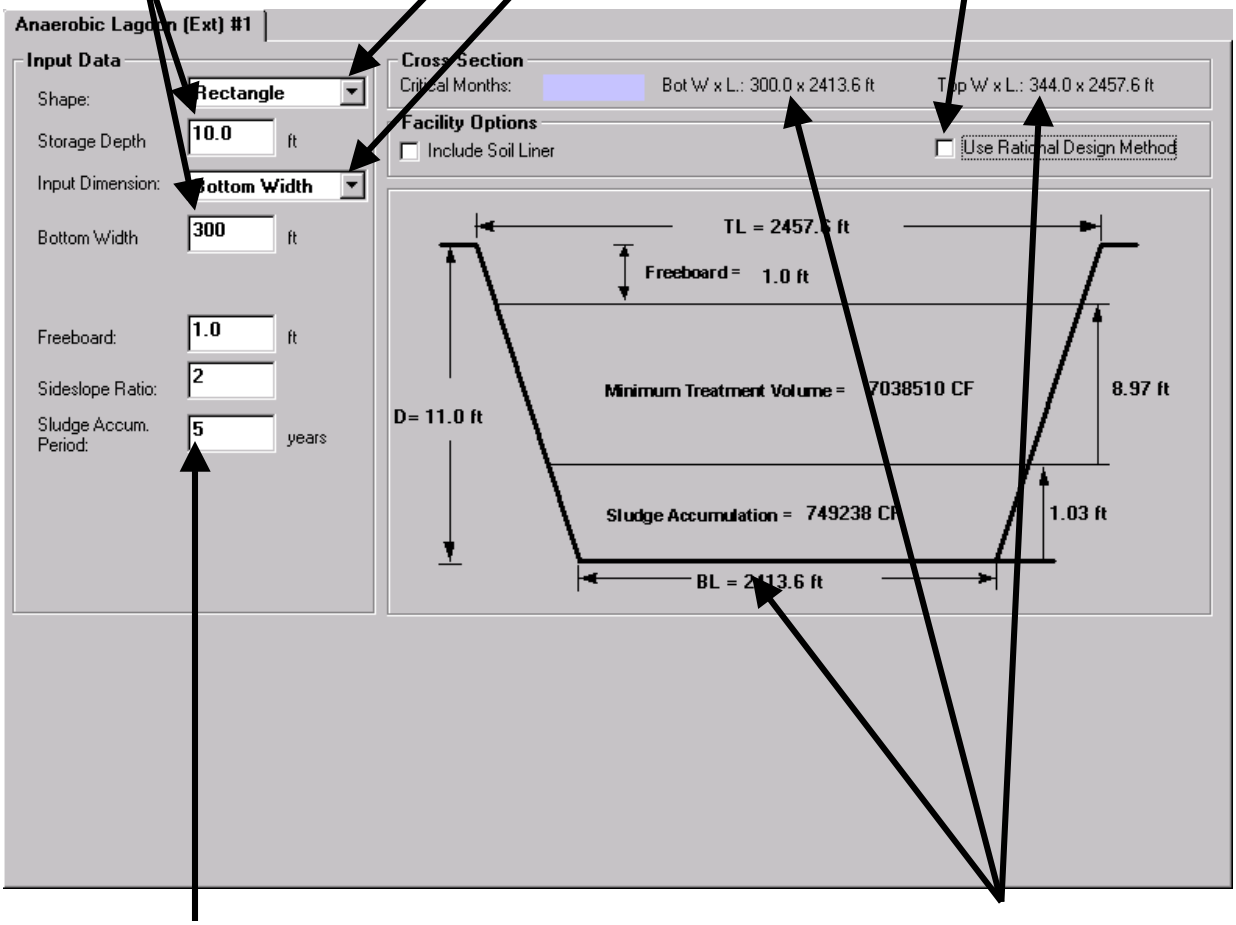
The following screen illustrates a rectangular anaerobic lagoon with external storage design:

Vary depth and bottom width to accommodate the site.

Click on drop-down list to select the shape of the lagoon to base design on. Choices are rectangular and circular.

Click on drop-down list to select Bottom Width **or** Bottom Length **dimension to base design on.**

The NRCS design methodology is used unless the Use Rational Design Method **is checked..**



Enter the number of years for sludge accumulation. At least 1 year of sludge accumulation period should be entered to account for sludge buildup in the lagoon.

AWM computed dimensions for the example shown.

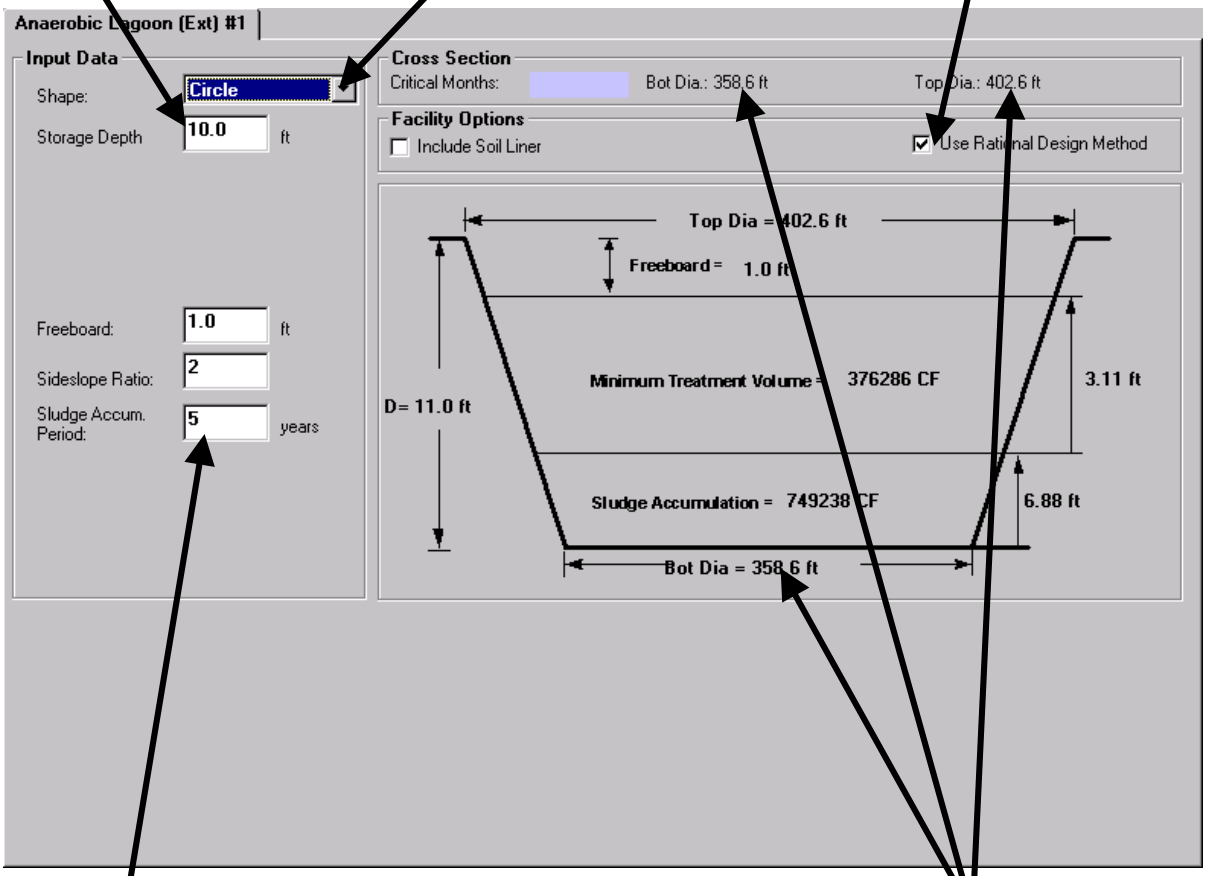
Design Screen

The following screen illustrates a circular anaerobic lagoon with external storage design based on using the Rational Design Method:

Vary depth to accommodate the site.

Click on drop-down list to select shape of the pond to base the design on. Choices are Rectangular and Circular.

The NRCS design methodology is used unless the Use Rational Design Method **is checked.**



Enter the number of years for sludge accumulation. At least 1 year of sludge accumulation period should be entered to account for sludge buildup in the lagoon.

AWM computed dimensions for the example shown.

Storage depth is the total depth of the lagoon less freeboard. Since lagoons with external storage do not provide storage, an additional storage component must follow this type of facility in the management train.

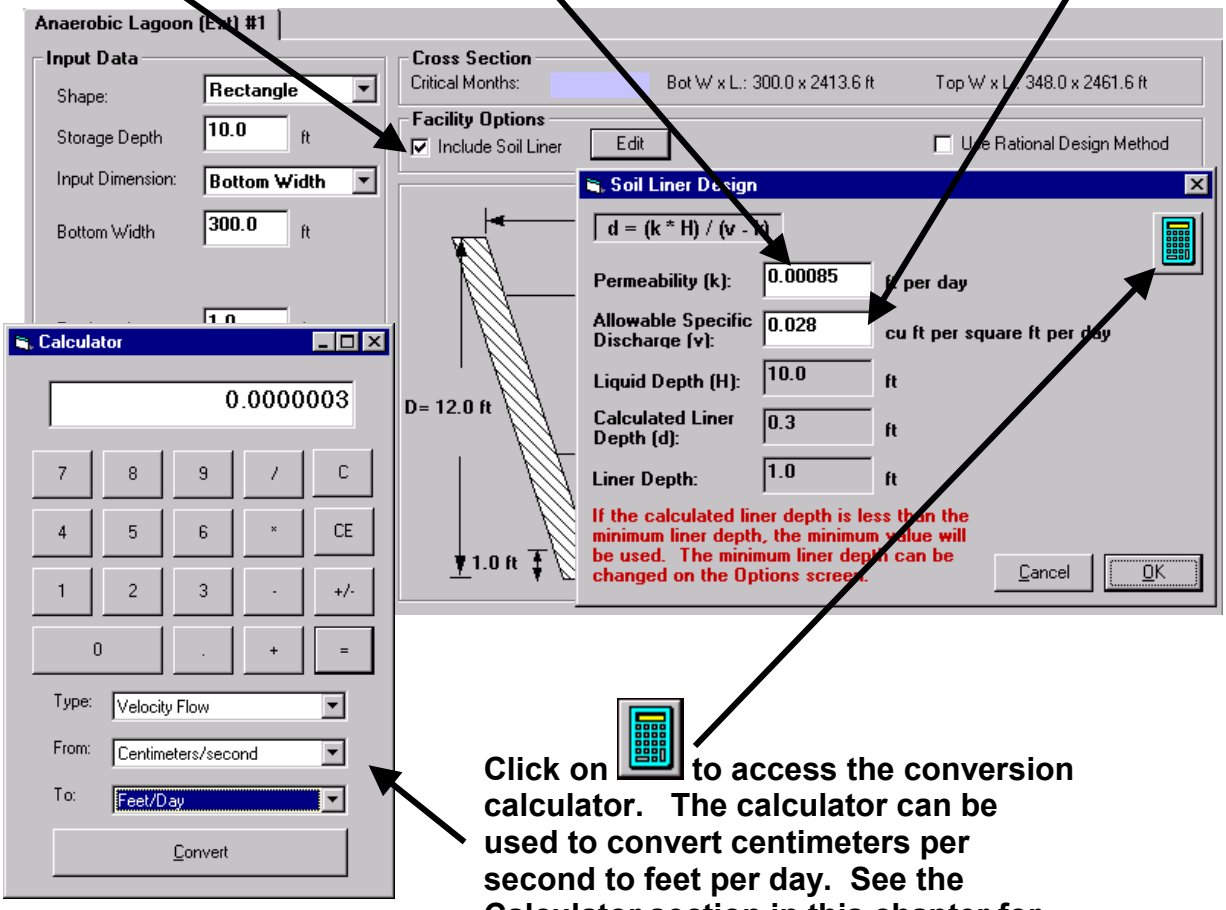
Design Screen

The following screen illustrates the soil liner design option for an anaerobic lagoon with external storage:

Click on Include Soil Liner **to access the soil liner design screen.**

Enter the permeability of the soil to be used for the liner. This value is normally available from the soil mechanics report.

Enter the allowable specific discharge. This value may be based on regulatory requirements.



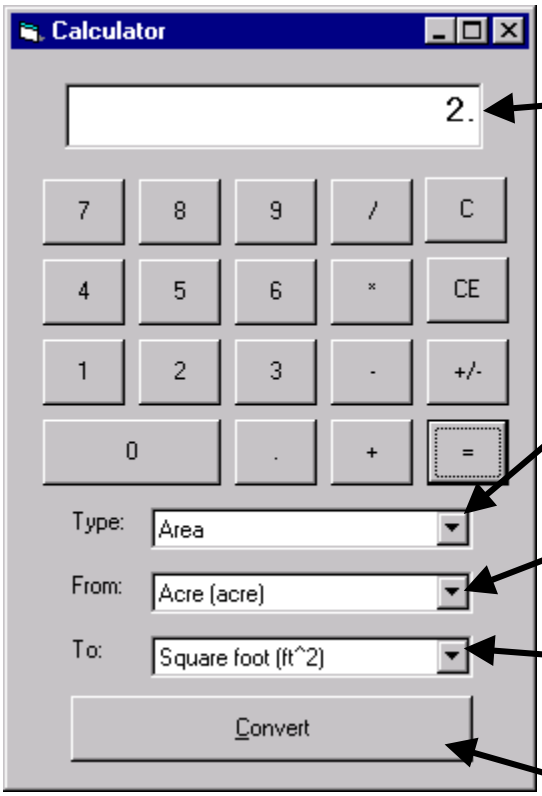
Click on **to access the conversion calculator. The calculator can be used to convert centimeters per second to feet per day. See the Calculator section in this chapter for more information.**

The liquid depth AWM uses for designing the soil liner is based on the total depth of the lagoon less freeboard.

Conversion Calculator

The Conversion Calculator is available within all screens in AWM and is activated by clicking on the Calculator button on the AWM tool bar or selecting the Unit Conversion Calculator from the Tools drop-down menu. The calculator can be used to perform mathematical calculations but is provided primarily for unit conversion. Select the To and From units in the combo boxes, type in the number to be converted and press the Convert button.

The following screen illustrates how the Calculator can be used to convert units:



Enter the value of the unit to convert. This example is converting 2 Acres to Square Feet.

Click on the drop-down list for unit type to select the type of unit to convert. Area is selected for this example.

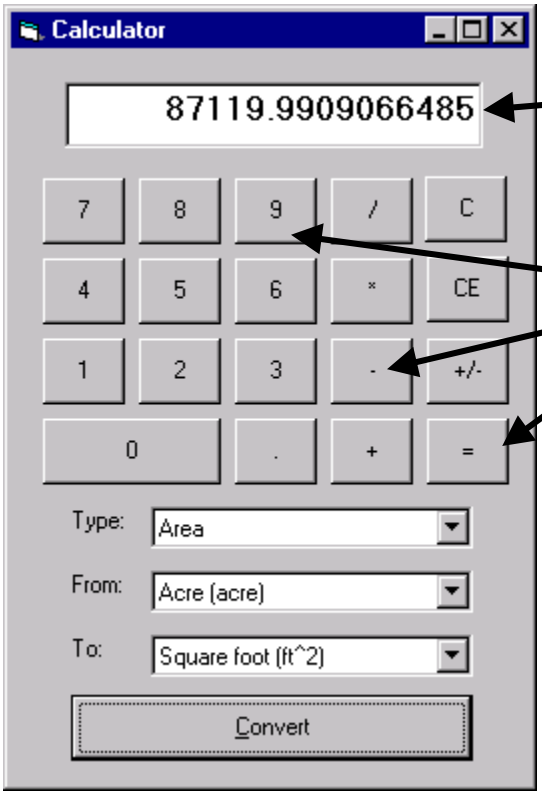
Click on the "From:" drop-down list to select the unit to convert from. Acre is selected for this example.

Click on the "To:" drop-down list to select the unit to convert to. Square foot is selected for this example.

Click on the Convert button to perform the conversion.

Conversion Calculator

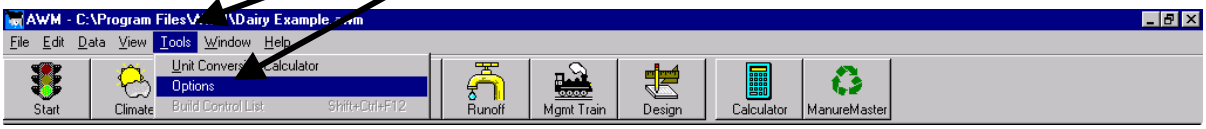
The following screen illustrates the results of the conversion of 2 acres to square feet:



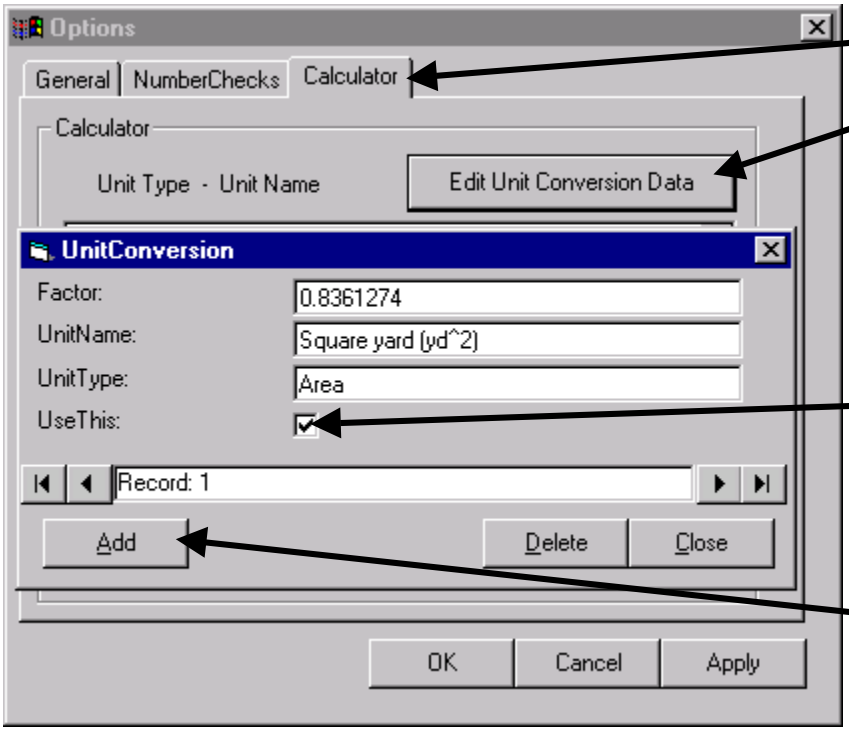
The calculator displays the value in square feet of the conversion of 2 acres shown in the previous screen.

The numeric keys on the calculator can be clicked on to perform mathematical calculations. The numeric keys on the computer keyboard can be used for this purpose as well.

The data used in the conversion calculator can be edited by selecting Tools->Options from the main menu in AWM.



Conversion Calculator



Click on the Calculator tab and the Edit Unit Conversion Data **button to edit existing conversion data or add additional conversion data.**

If the UseThis: **box is checked the unit conversion factor will be available for use in the calculator.**

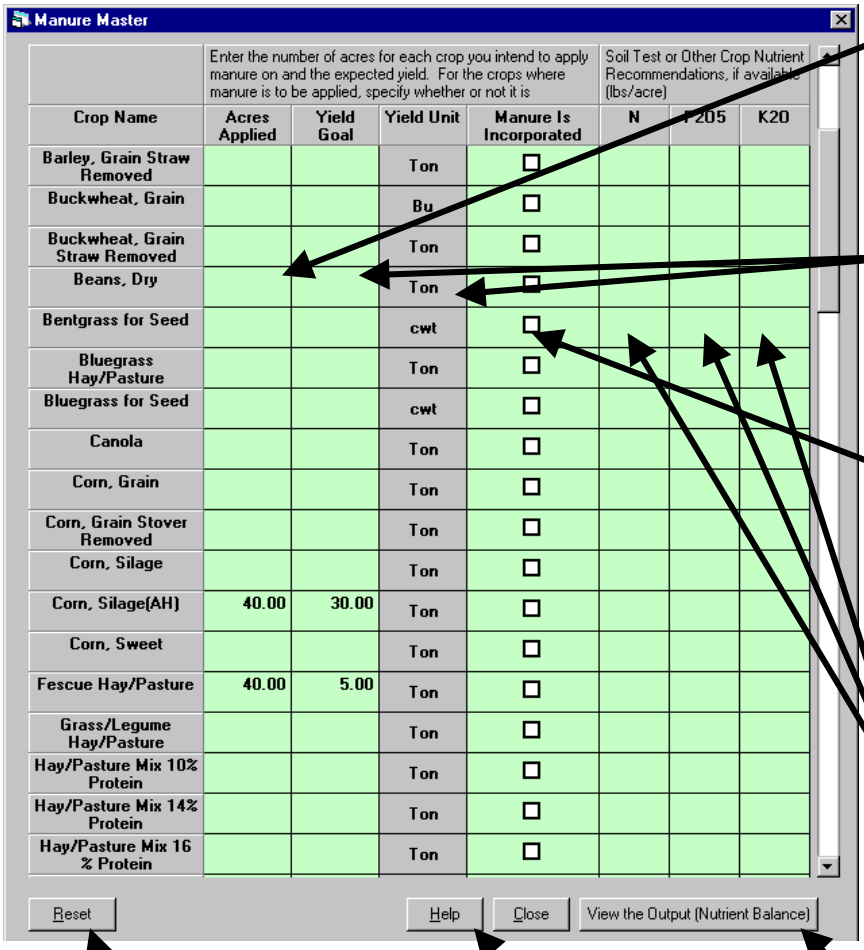
Click on the Add **button to add additional conversion factors.**

The user should have a good understanding of the data format before attempting to edit or add data to the Conversion Calculator database.

Manure Master

Manure Master is a simple screening tool can help assess the relative potential for the nutrients contained in the animal manure from an animal feeding operation to meet the crop uptake and utilization requirements for those crops that receive applications of manure. Manure Master calculates a balance between the nitrogen, phosphorus, and potassium content in the manure and the quantity of these nutrients used by crops. This balance can be calculated based upon recommended fertilizer application rates, when known or upon estimated plant nutrient content, when recommended fertilizer application rates are not known. For nitrogen, the balance is calculated taking into account expected losses from leaching, denitrification, and volatilization. Manure Master is not a nutrient management planning tool, therefore criteria in the NRCS Practice Standard 590, Nutrient Management, should be referenced when developing nutrient management plans.

The following screens illustrate the use of Manure Master:



Enter the acres of each crop that manure and waste water is applied on.

Enter the target yield goal for each crop in the units indicated next to the Yield Goal column.

Click on the ☐ check box to indicate manure and waste water are incorporated into the soil when applied. Leave blank if manure and waste water is not incorporated.

If available, enter recommended nitrogen, phosphorous, and potassium application rates in pounds per acre.

Click on the Reset **button to clear the input table.**

Click on the Help **button to view help.**

Click on the View the Output (Nutrient Balance) **button to view nutrient balance.**

Manure Master

The following screen illustrates output from Manure Master based on the previous screen:

Nutrient Utilization

This report is to help evaluate the amount of nutrients your farm would produce compared to the amount of nutrients it could utilize based on the crops listed on the next page that are part of your crop management system.

The factors used to calculate manure nutrient content are developed from estimates that account for nutrient losses due to collection, storage, treatment and handling. When manure is not incorporated, an additional nitrogen loss is taken for volatilization.

According to the AWM computer program you have the following annual nutrient balance:

Nutrient	Amount Applied (Pounds)	Amount Utilized (Pounds)	Balance (Pounds)	
Nitrogen – N	26,352	37,753	11,401	pounds needed
Phosphate – P_2O_5	8,807	3,911	4,896	pounds of excess
Potash – K_2O	16,871	10,401	6,470	pounds of excess

Note: Increase or decrease the number of animals or acres of cropland intended for manure application if you wish to adjust the nutrient balance based on N, P_2O_5, or K_2O.

If your balance for phosphorus exceeds the amount utilized by the crops grown, you may be accumulating phosphorus in the soil. Phosphorus is known to contribute to water quality problems. As the amount of available phosphorus in the soil increases, the potential for it to move by the processes of erosion, runoff, or leaching increase. The Phosphorus Index may be used to determine the relative risk for phosphorus to become a water quality problem on your farm.

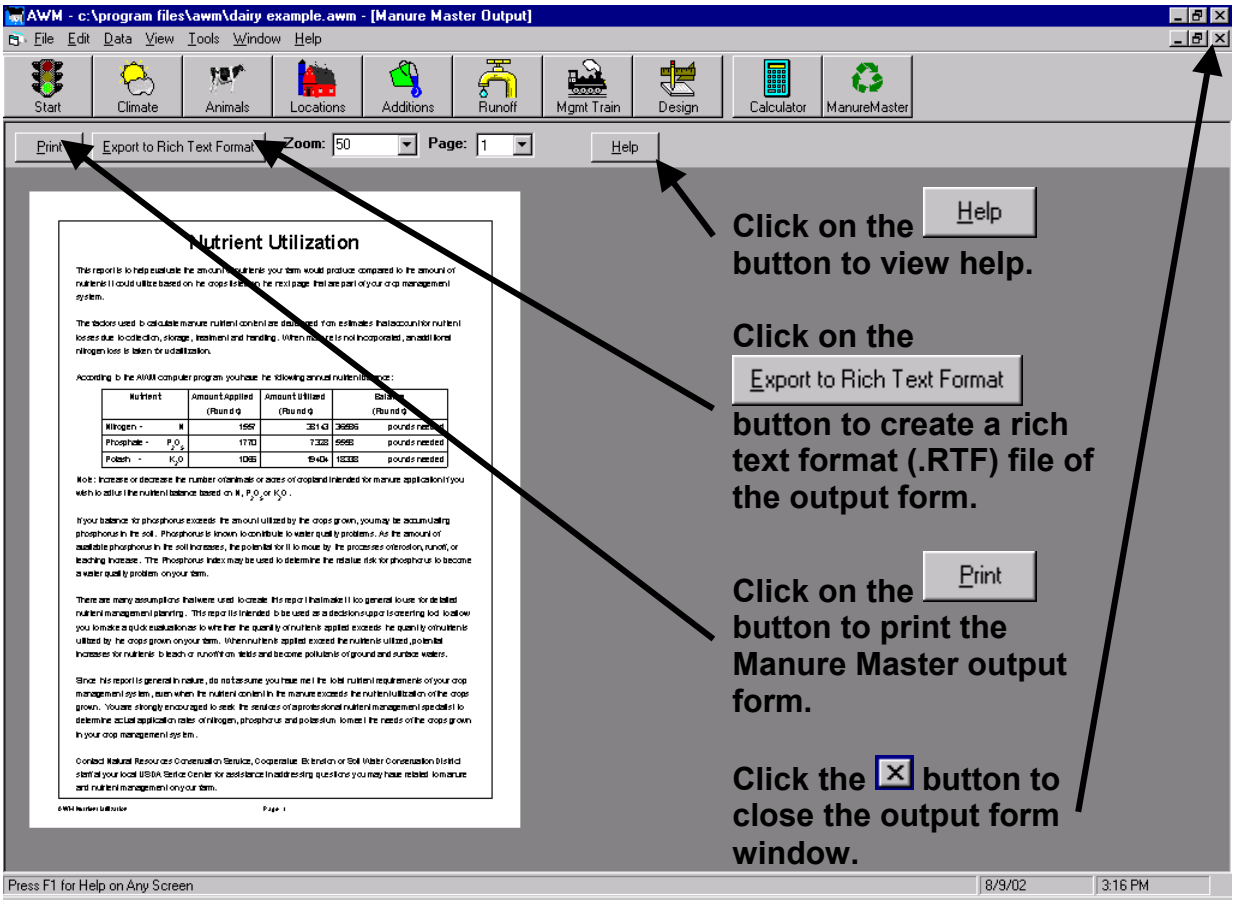
There are many assumptions that were used to create this report that make it too general to use for detailed nutrient management planning. This report is intended to be used as a decision support screening tool to allow you to make a quick evaluation as to whether the quantity of nutrients applied exceeds the quantity of nutrients utilized by the crops grown on your farm. When nutrients applied exceed the nutrients utilized, potential increases for nutrients to leach or runoff from fields and become pollutants of ground and surface waters.

Since this report is general in nature, **do not** assume you have met the total nutrient requirements of your crop management system, even when the nutrient content in the manure exceeds the nutrient utilization of the crops grown. You are strongly encouraged to seek the services of a professional nutrient management specialist to determine actual applications rates of nitrogen, phosphorus and potassium to meet the needs of the crops grown in your crop management system.

Contact Natural Resources Conservation Service, Cooperative Extension or Soil and Water Conservation District staff at your local USDA Service Center for assistance in addressing questions you may have related to manure and nutrient management on your farm.

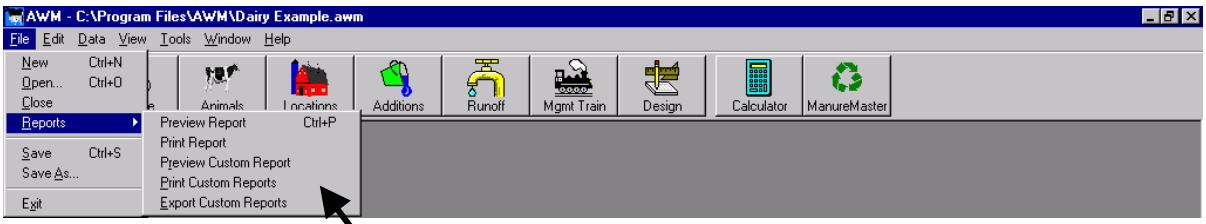
Manure Master

The following screen illustrates options for Manure Master output:



Chapter 5 – Reports

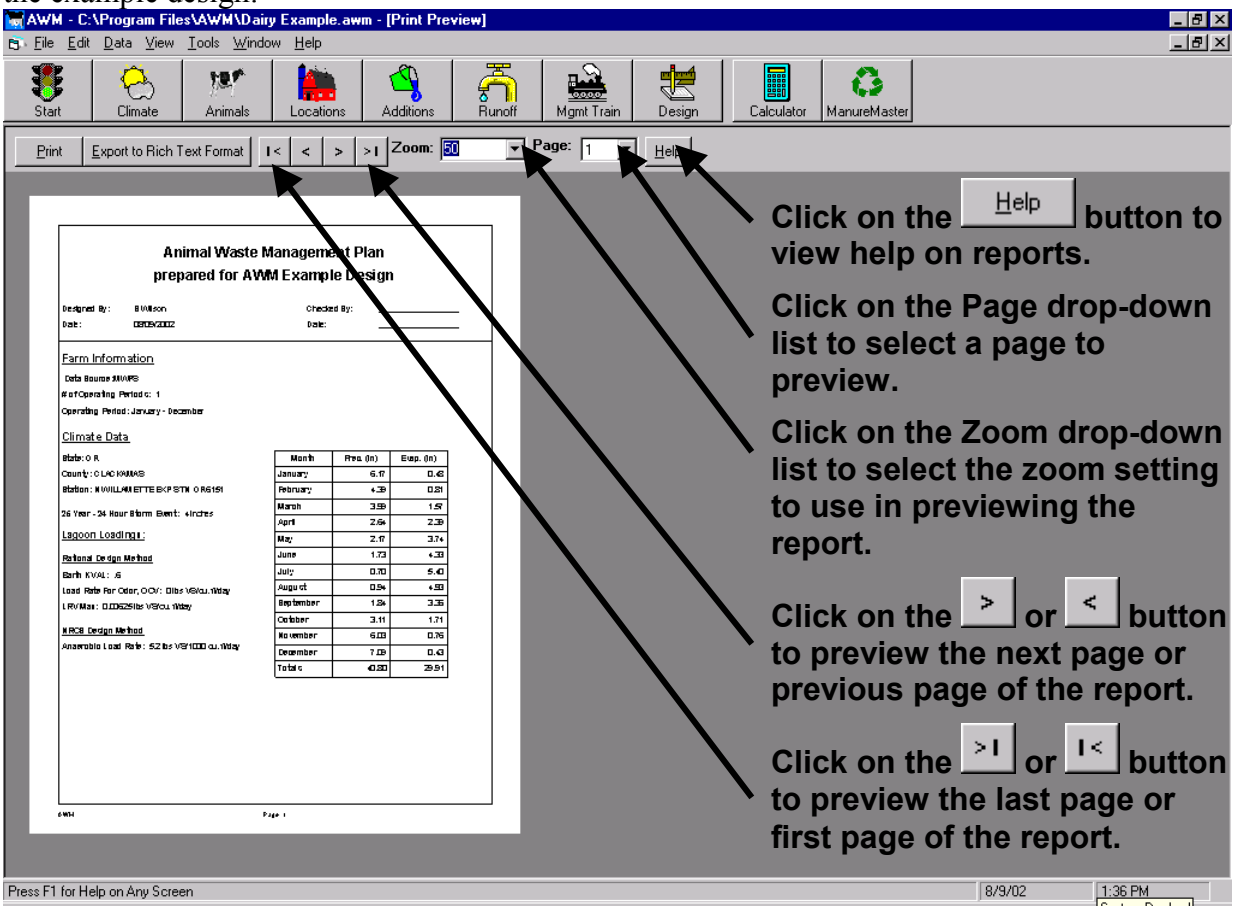
AWM generates two different report formats, standard and custom, to document the system design. The reports are generated from File->Reports on the main AWM menu as shown below:

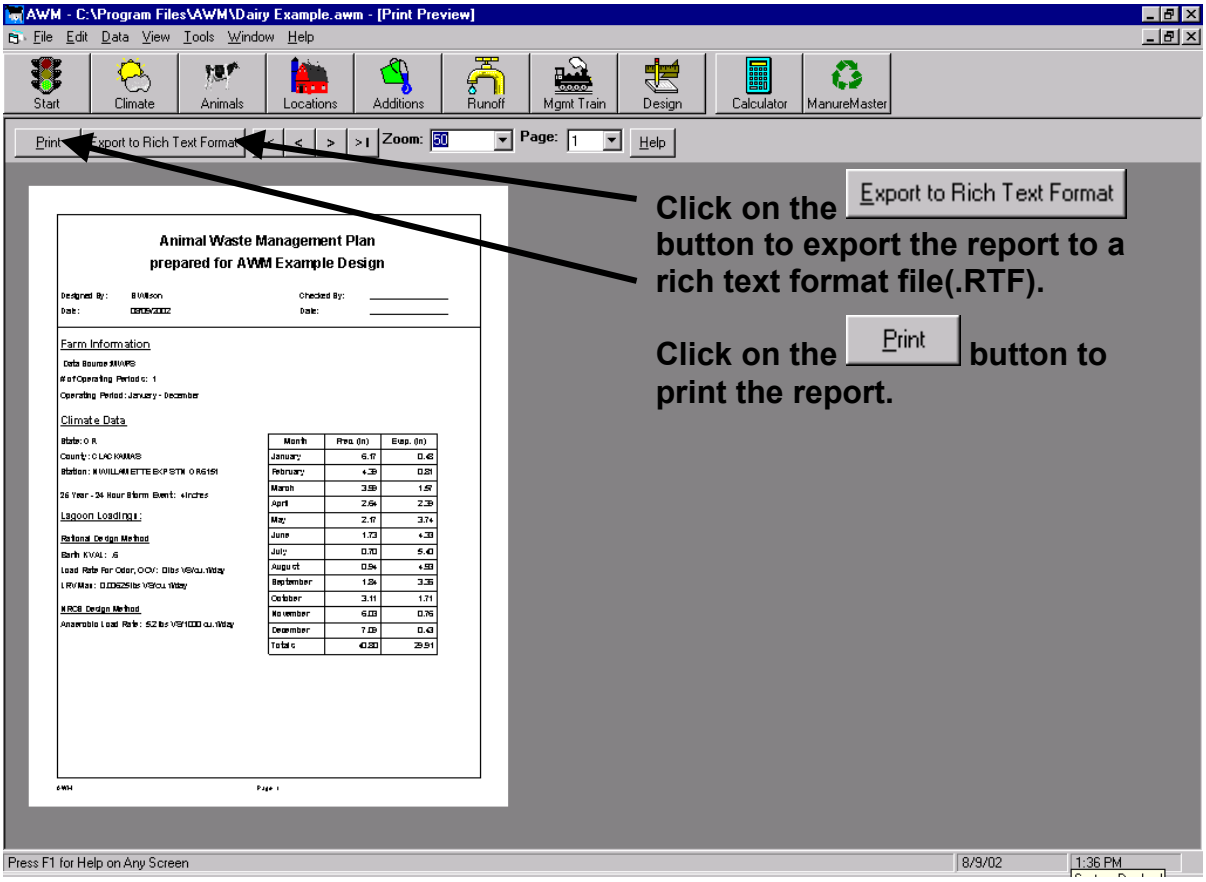


Click on the preferred menu item in the drop-down list to print or preview the standard or custom report. Pressing the [Ctrl] + [P] keys on the keyboard will preview the standard report without having to access the file menu.

Previewing and Printing a Standard Report

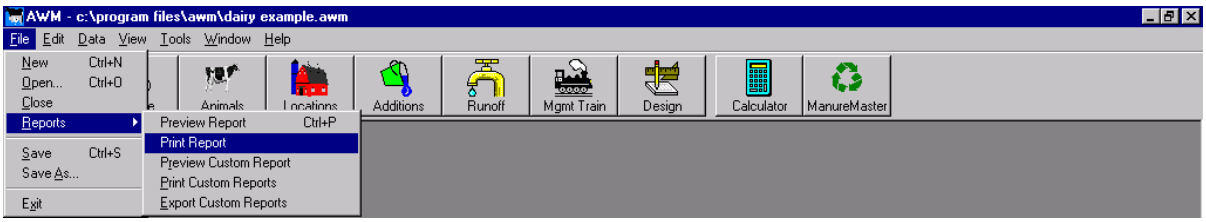
Selecting the Preview Report or pressing the [Ctrl] + [P] keys results in the following screen for the example design:





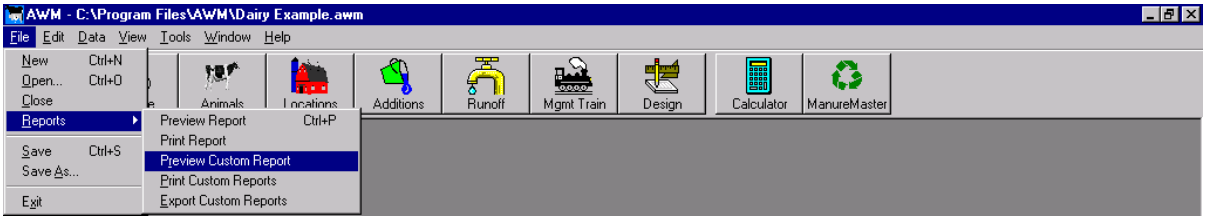
Reports exported to a file can be manipulated and enhanced using a word processor such as Microsoft Word. When using Microsoft Word, the Rich Text format file must be immediately "saved as" a Microsoft Word document, then closed and reopened. The view in Microsoft Word must be set to **Page Layout** as all text will be displayed within text boxes. If only line breaks are seen, another view is being used.

Selecting the Print option will print the standard report as shown on the following screen:

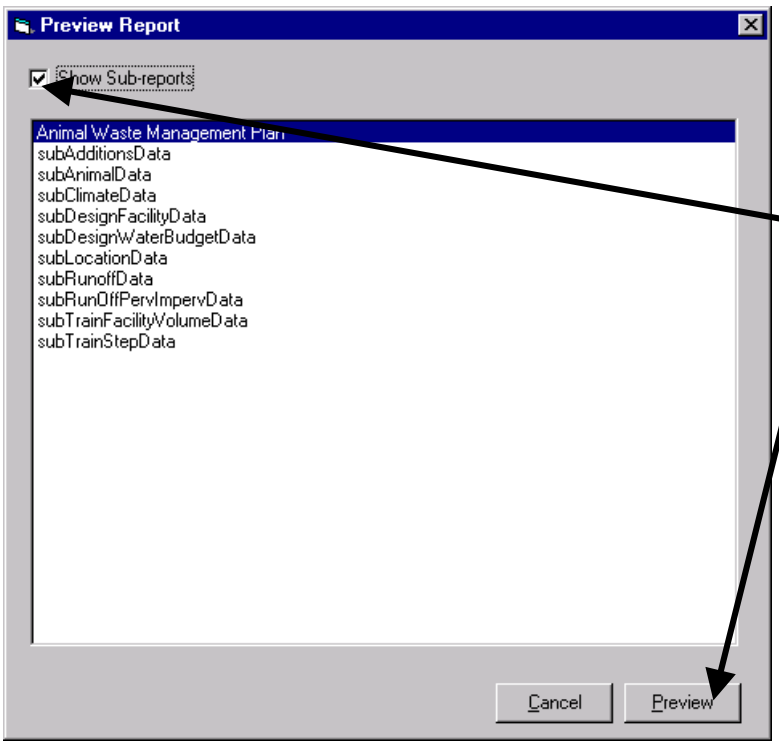


Previewing, Printing and Exporting Custom Reports

To preview a custom report select the Preview Custom Report from the Reports menu as shown on the following screen:



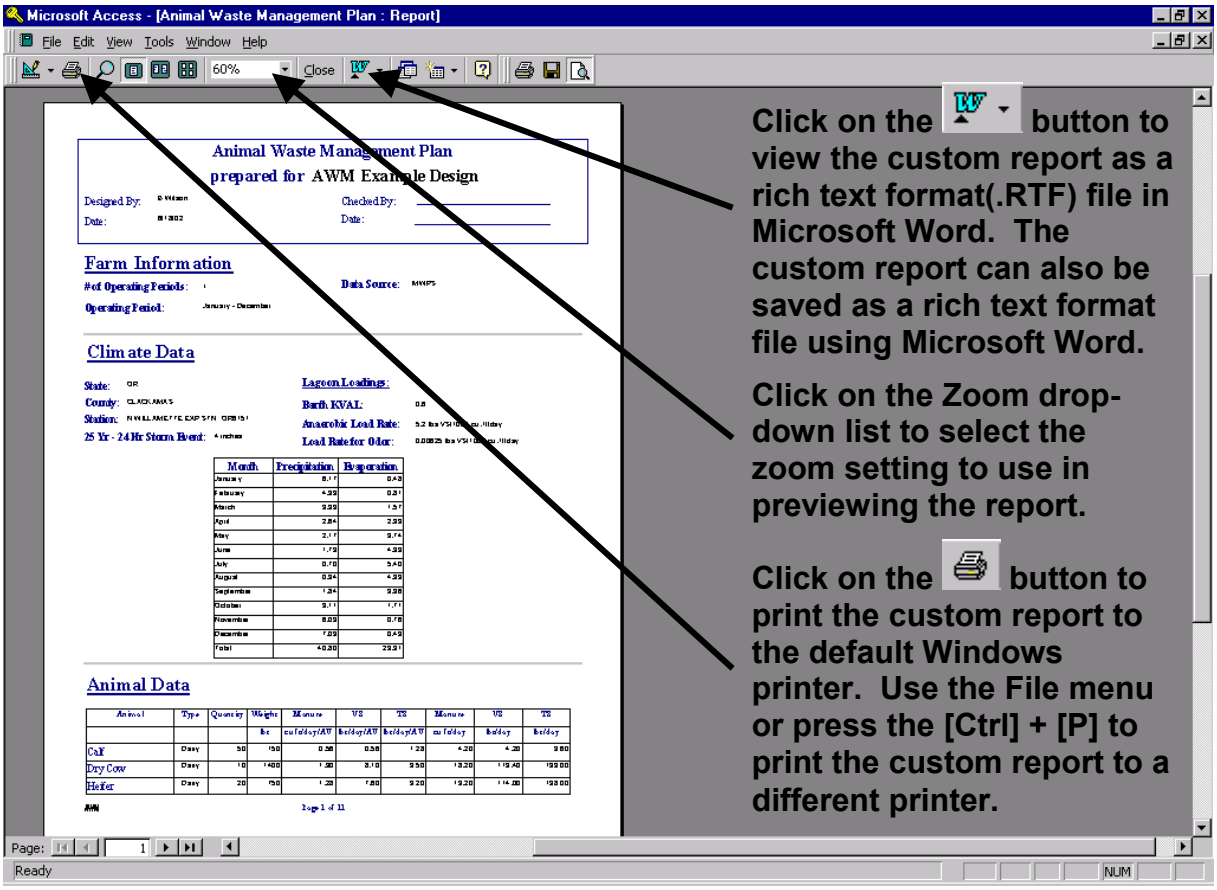
Selecting the Preview Custom Report results in the following screen for the example design:



Click on the  **check box to show sub reports.**

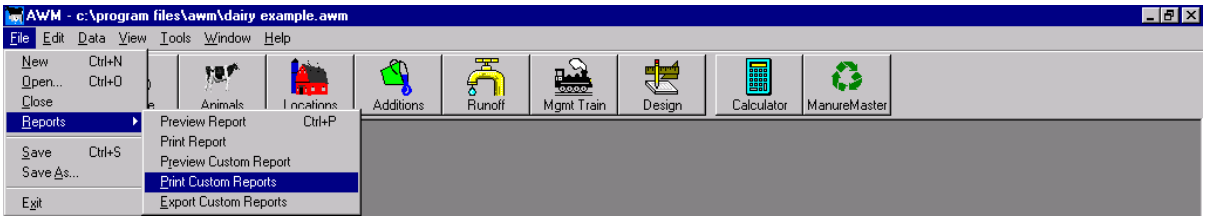
Click on a report to highlight it and then click on the  **button to preview the highlighted report.**

Selecting the Animal Waste Management Plan custom report to preview results in the following screen for the example design:

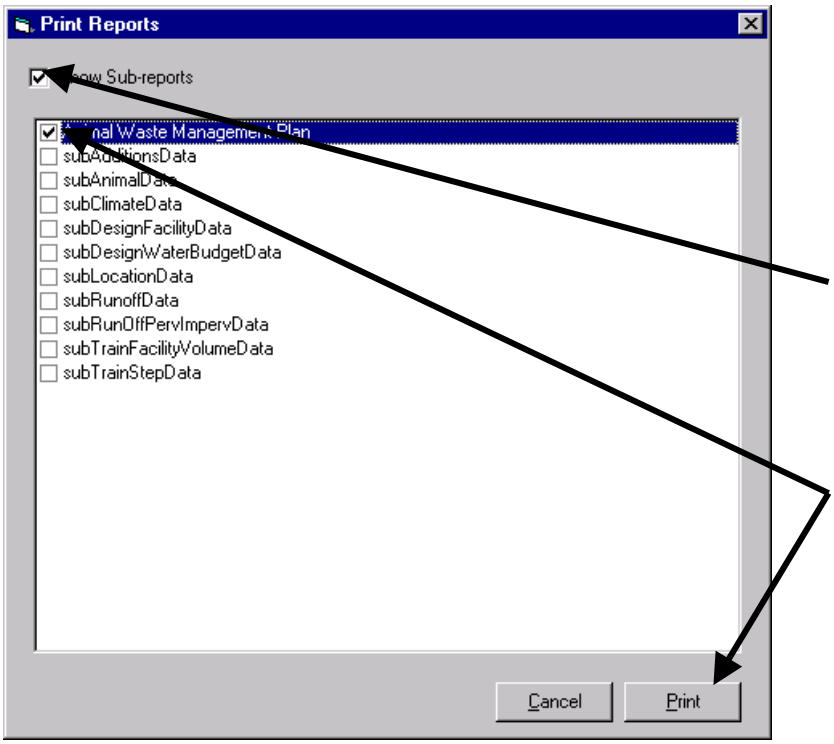


The AWM program uses Microsoft Access to preview a custom report. Using the edit tools within Microsoft Access the user can edit the default custom report and format it to their liking or create and save a custom report to a new file for later use. The only limitation to creating custom reports for use in the AWM program is the users knowledge level on how to create and edit reports using Microsoft Access.

To print a custom report select the Print Custom Reports from the Reports menu as shown on the following screen:



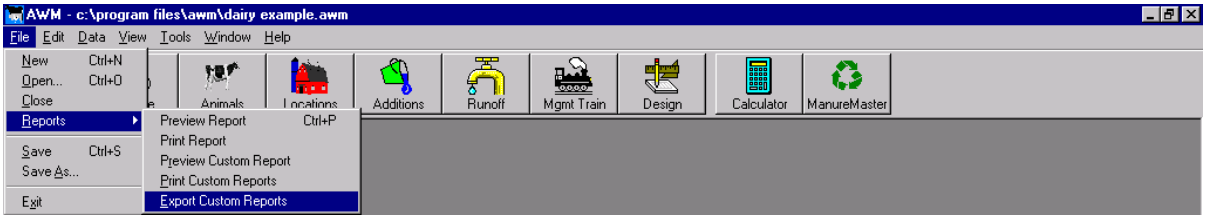
Selecting the Print Custom Reports results in the following screen for the example design:



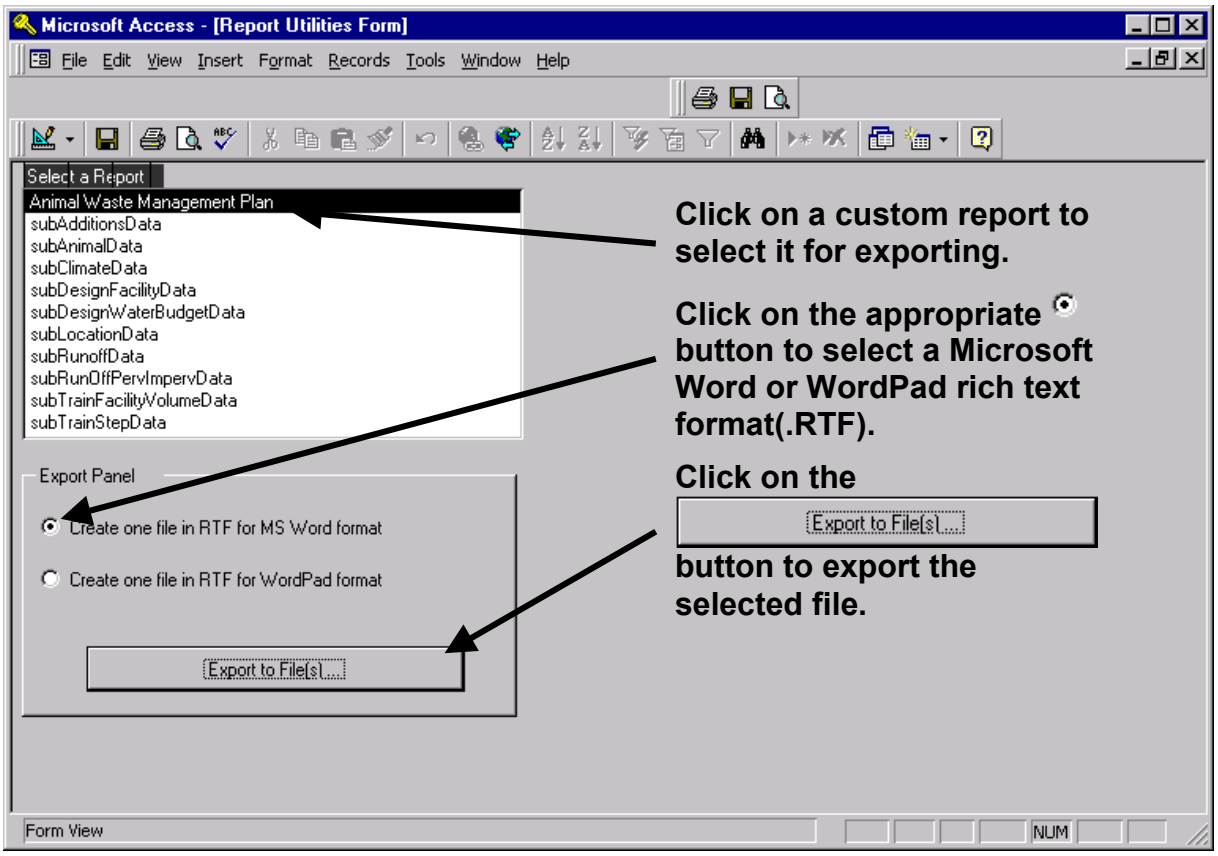
Click on the  **check box to show sub reports.**

Click on the check boxes to select the custom reports to print and then click on the  **button to print the reports.**

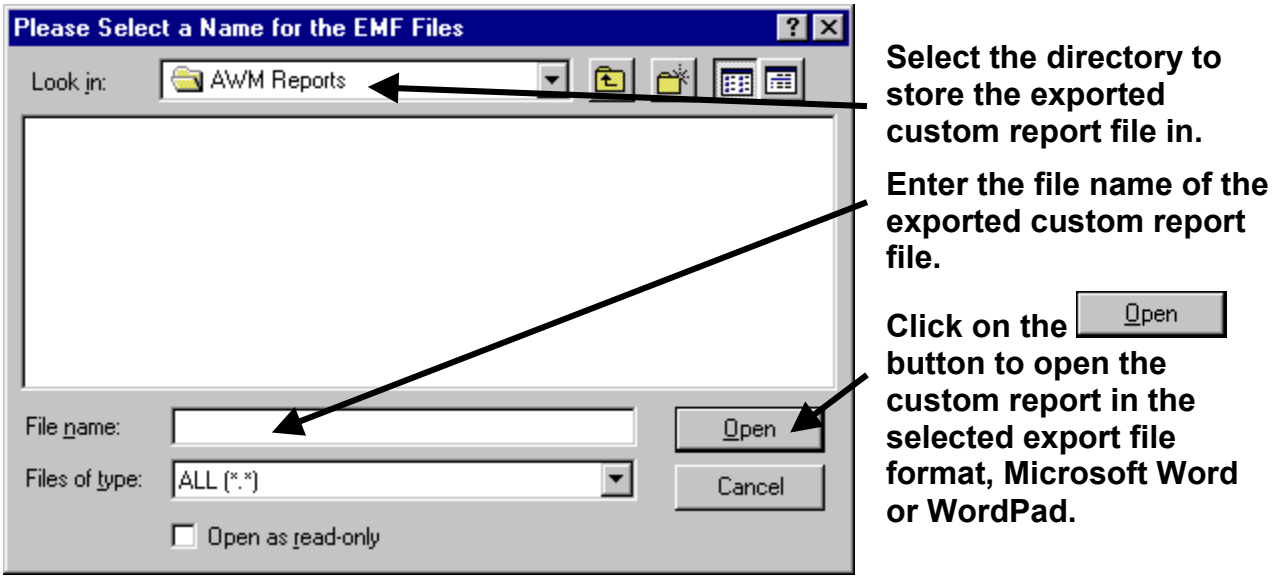
To export a custom report to a Microsoft Word or WordPad rich text format(.RTF) file, select the Export Custom Reports from the Reports menu as shown on the following screen:



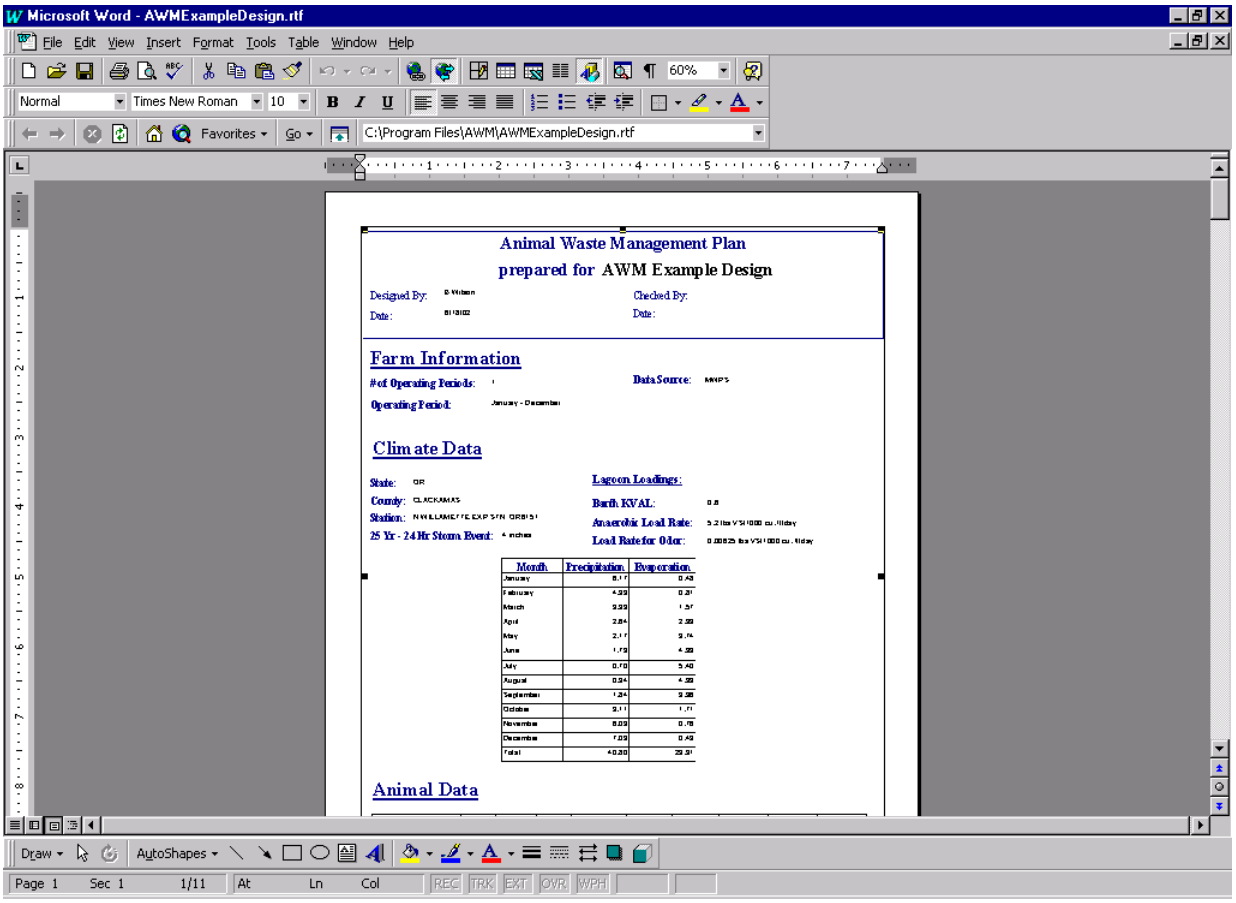
Selecting the Export Custom Reports results in the following screen for the example design:



Clicking on the  button results in the following screen for the example design:



Clicking on the Open button results in the following screen for the example design:



Use the features of the selected program to edit and save the custom report.

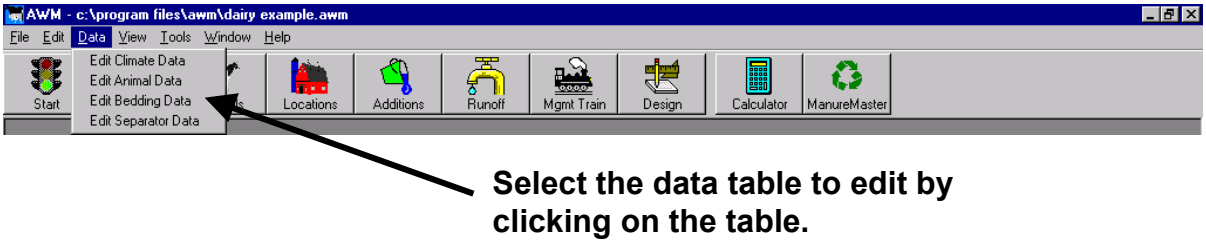
Chapter 6 – Modifying the AWM Database

The AWM database has four tables, all of which can all be modified. They are:

- Climate
- Animals
- Bedding
- Separators

Note: Changes made to the database do not take affect until AWM is exited and then restarted.

The tables within the AWM database are accessed from the main AWM menu by first clicking on Data and then clicking on the table to be modified as illustrated in the following screen:



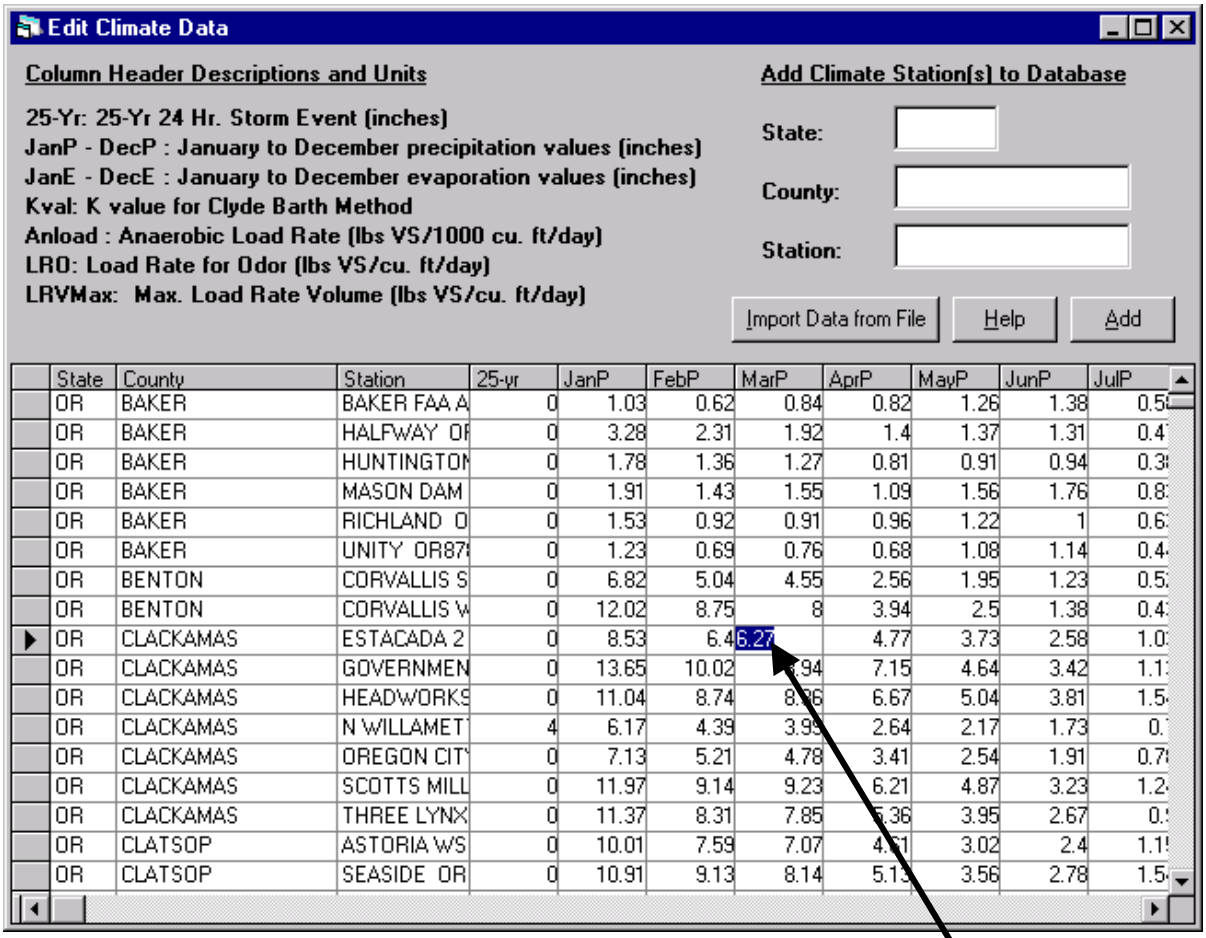
Editing Climate Data

If AWM is being used for the first time and a state database has not been imported into the program, please refer to Chapter 2, Installing and Starting AWM. Instructions are given in this chapter for downloading a state's database that includes climate data from the NRCS National Water and Climate Center.

There are several ways that climate data can be edited or added to the climate data table. Each method is described in the following:

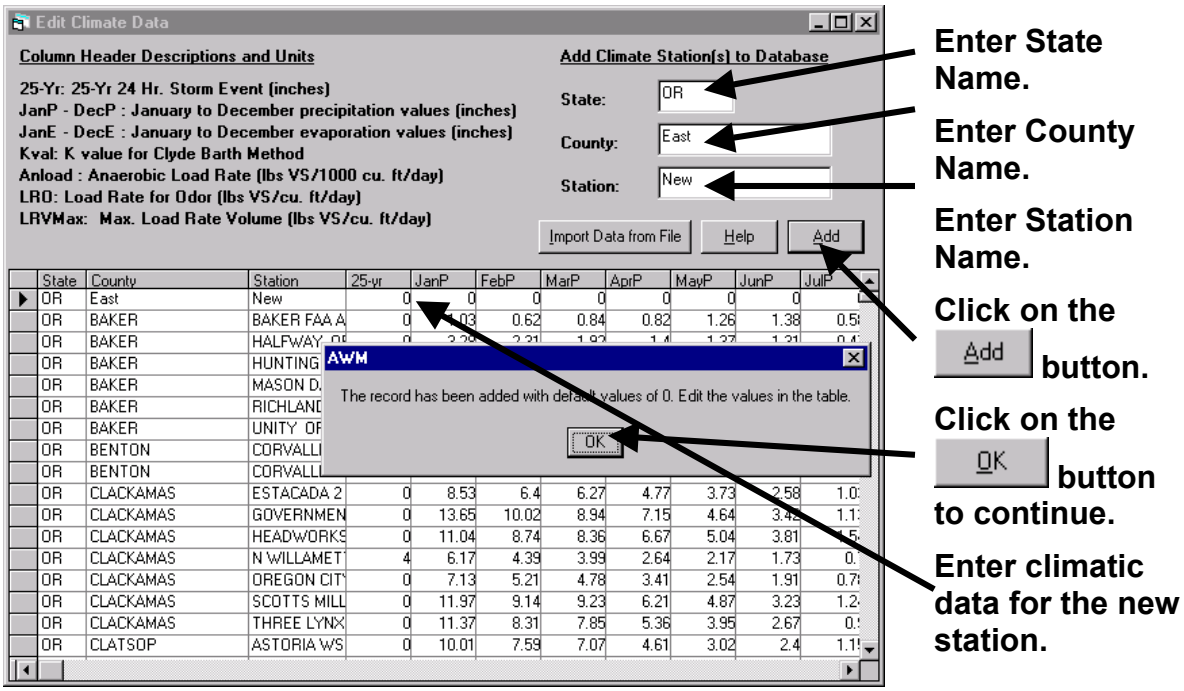
To edit existing climatic data, select the Data -> Edit Climate Data and the following screen will appear:

Click on the OK button to view the following screen.



Click on cell to be edited and then type in new value.

The following screen illustrates how to add a climate station to the climate database:



After completing data entry for new climate stations, close the Edit Climate Data screen by clicking on the ☒ in the upper right hand corner of the screen. After exiting and restarting AWM, the new climate station will have been positioned in alphabetical order by state, county, and climate station.

Importing Climate Data

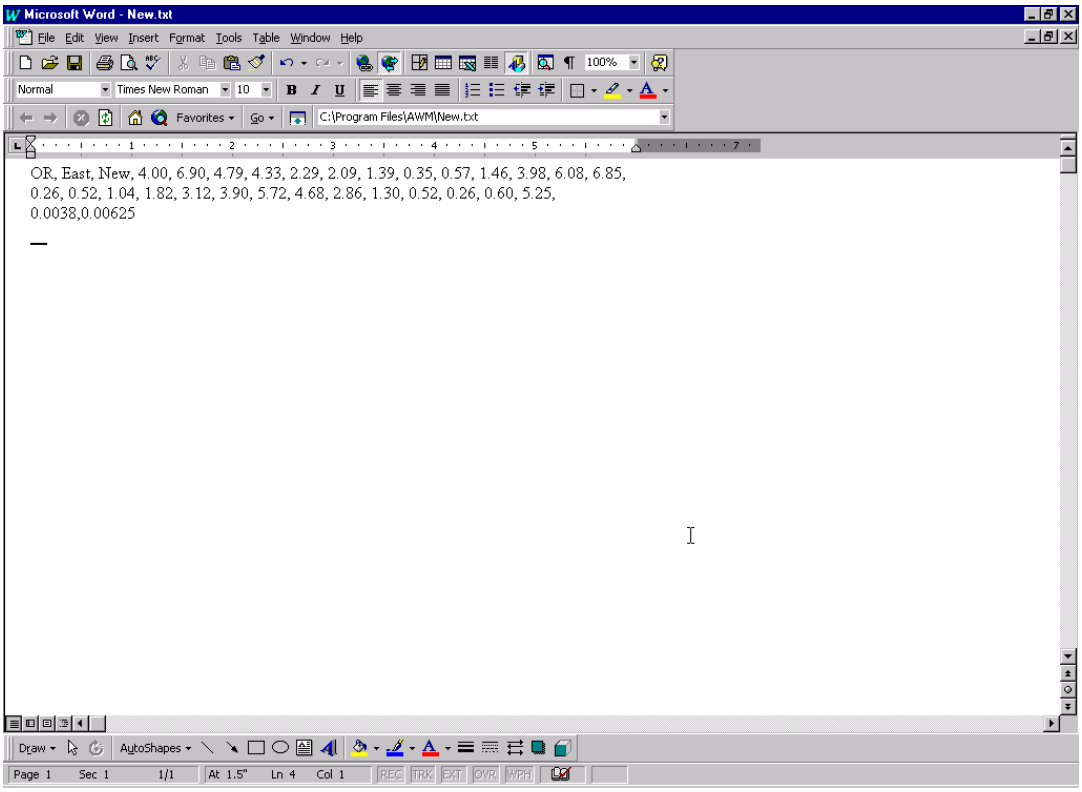
You can import climate data from a file that is in comma delimited format. The file must have all of the fields in the same order as they appear in the climate data table. The file should not have a header row and should have one climate station per line. The file can have as many lines as desired. When importing data, if a value already exists in the table, a dialog box will popup and ask if it is OK replace the value that is in the database.

There are several ways to build a data file for import into AWM. One way is to use Microsoft Word to develop the data and then save it as a text file(*.txt*). Another way is to use Microsoft Excel to develop the data and then save it as a comma delimited file(*.csv*). The order of data is State, County, Station, 25-year 24-hour precipitation, January precipitation, February precipitation, March precipitation, April precipitation, May precipitation, June precipitation, July precipitation, August precipitation, September precipitation, October precipitation, November precipitation, December precipitation, January evaporation, February evaporation, March evaporation, April evaporation, May evaporation, June evaporation, July evaporation, August evaporation, September evaporation, October evaporation, November evaporation, December evaporation, Barth's Kval, anaerobic lagoon volatile solids loading rate, volatile solids loading rate for odors and Rational Method maximum anaerobic lagoon volatile solids loading rate.

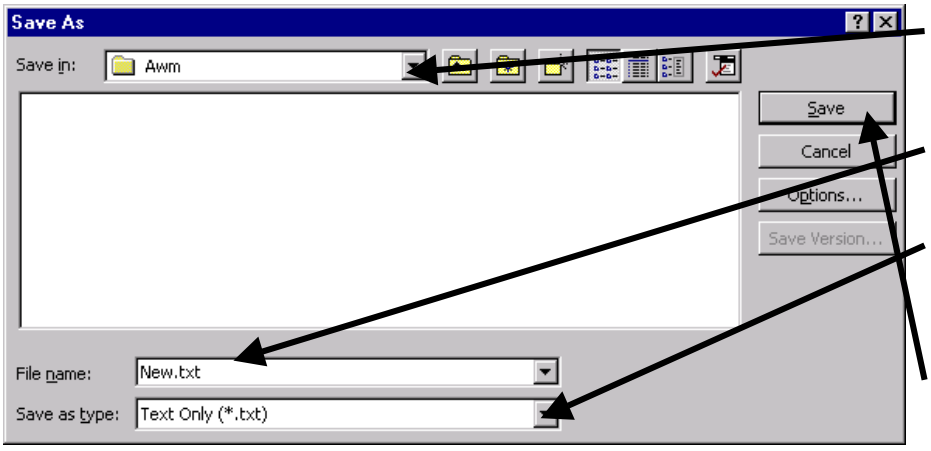
An example of one line of climatic data follows:
OR, East, New, 4.00, 6.90, 4.79, 4.33, 2.29, 2.09, 1.39, 0.35, 0.57, 1.46, 3.98, 6.08, 6.85, 0.26, 0.52, 1.04, 1.82, 3.12, 3.90, 5.72, 4.68, 2.86, 1.30, 0.52, 0.26, 0.60, 5.25, 0.0038,0.00625

Each line of the file should have 32 pieces of data separated by commas. The import will fail if this convention is not precisely followed. A space after the commas may be included or not used.

The following demonstrates saving the above line of data entered into Microsoft Word as a text file:



From the Microsoft Word main menu click on File -> Save As and the following window will appear:



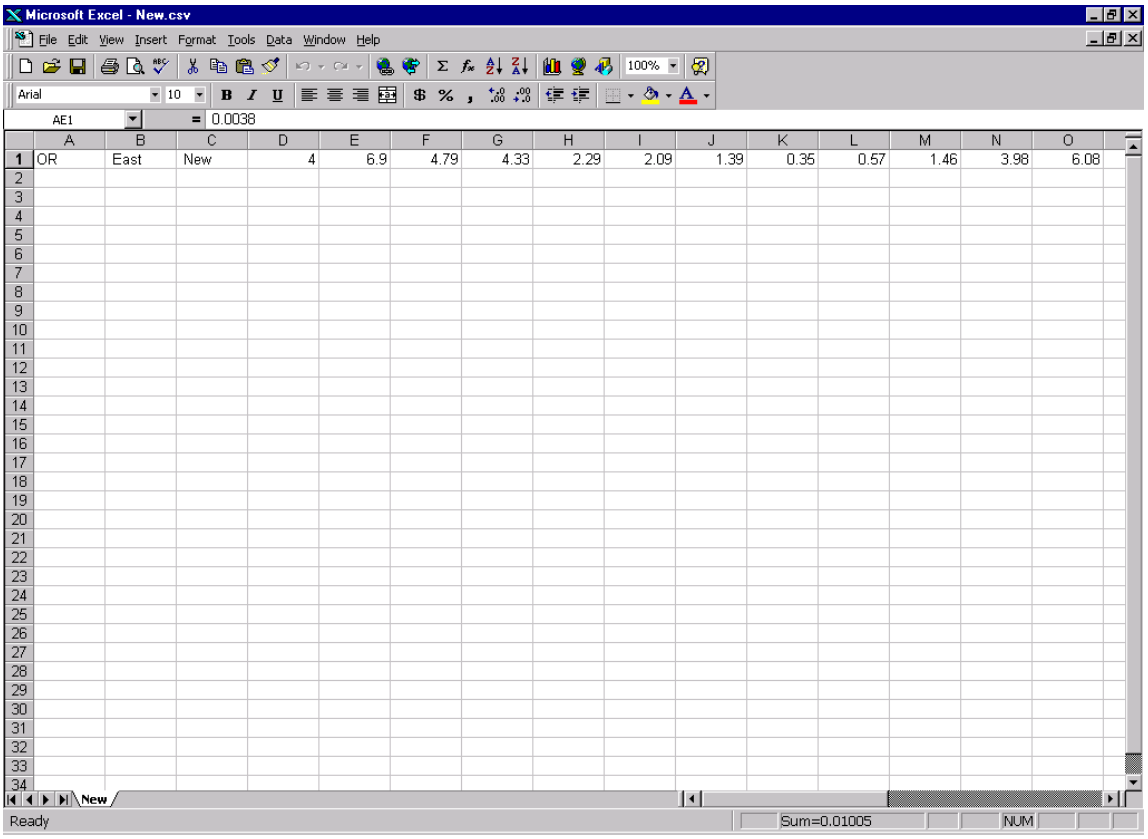
Change directory to (C:) > Program Files > Awm.

Type in file name.

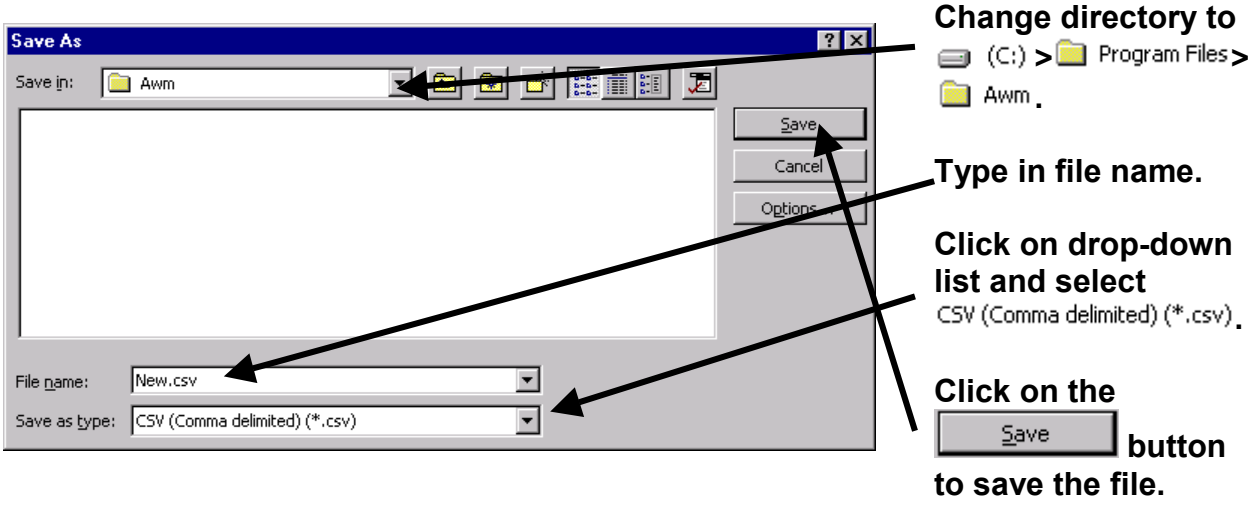
Click on drop-down list and select Text Only (*.txt).

Click on the Save **button to save the file.**

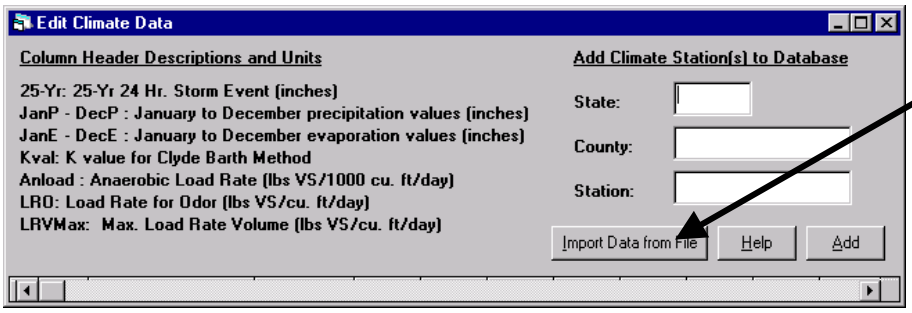
The following demonstrates saving the above line of data entered into Microsoft Excel as a comma delimited text file:



From the Microsoft Excel main menu click on File -> Save As and the following window will appear:

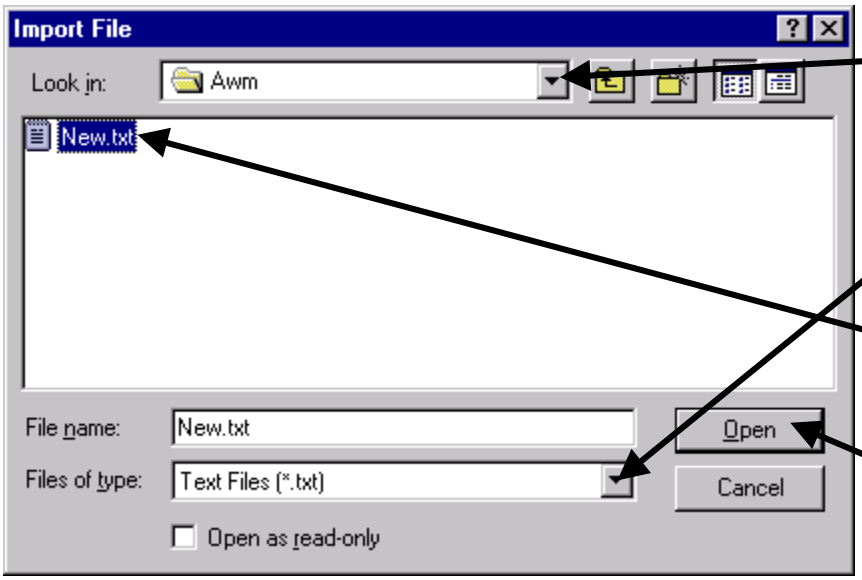


The following demonstrates importing a climate data *.txt* file into the AWM database:



Click on Import Data from File **button.**

This action results in the following screen:



Change directory to (C:) > Program Files > Awm.

Click on drop-down list and select Text Only (*.txt).

Select the file to import.

Click on the Open **button to import the file.**

The following dialogue box will appear if the file was successfully imported:

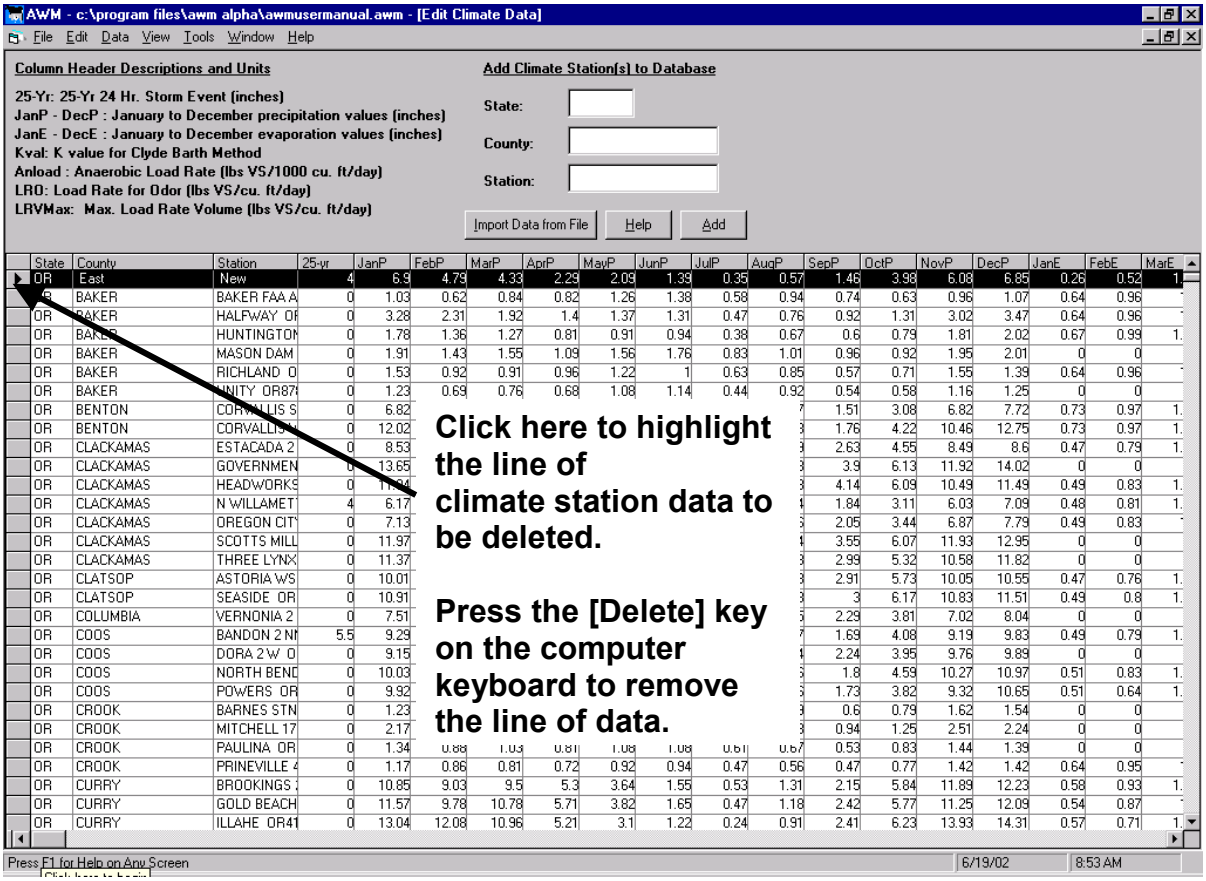
Click OK **button.**

The imported file will appear as the first line for the State in the climate data table. After exiting and restarting AWM, the records will be resorted into alphabetical order by county and weather station.

A climate file developed in Microsoft Excel can also be imported using the same procedure described for a text file but instead of selecting a Text Only (*.txt) file type you select CSV (Comma delimited) (*.csv) file type.

Deleting Climate Data

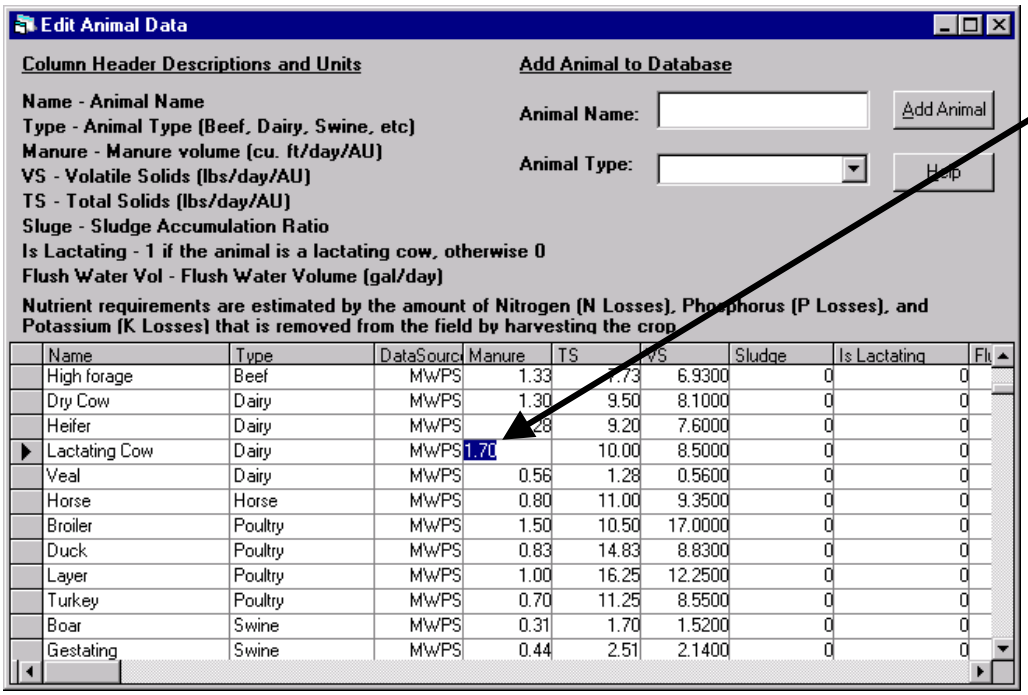
The following demonstrates how to delete a line of climate station data from the climate data table:



Editing the Animal Data

The animal data table can be edited two ways. One way is to edit data that already exist in the table and the other is to add data. The animal table does not have an import feature.

The following screen illustrates how to edit data in the animal data table:

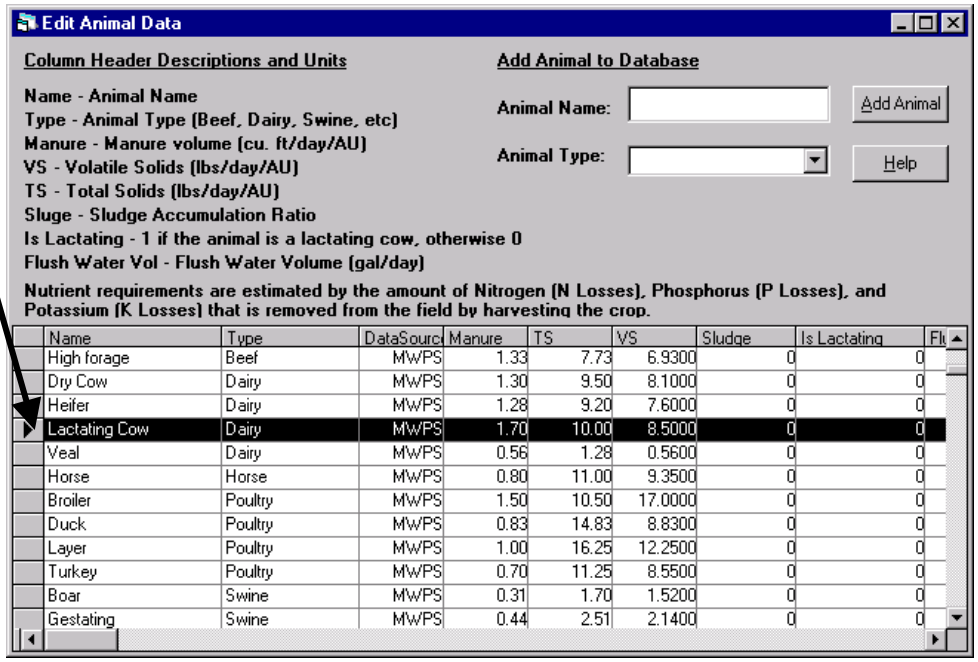


Click on the input cell and then edit or replace the existing data.

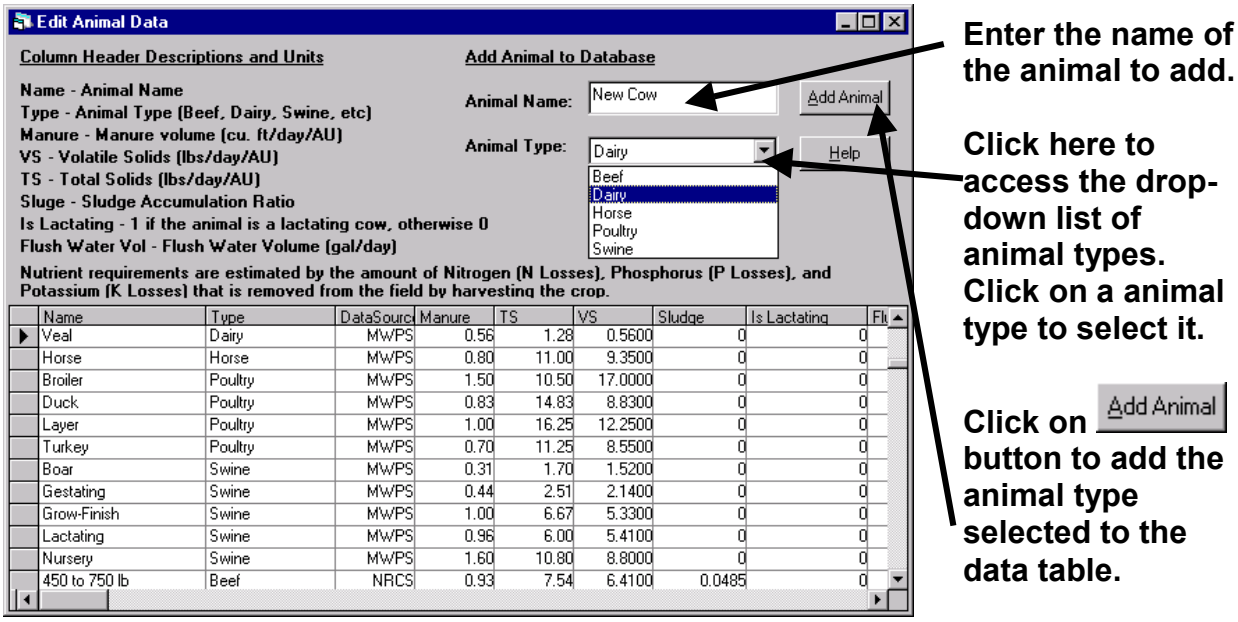
The following screen illustrates how to delete a animal from the animal data table:

Click here to highlight animal line to be deleted.

Then press the [Delete] key on computer keyboard to remove the line of data.



The following screen illustrates how to add animal data to the animal data table:

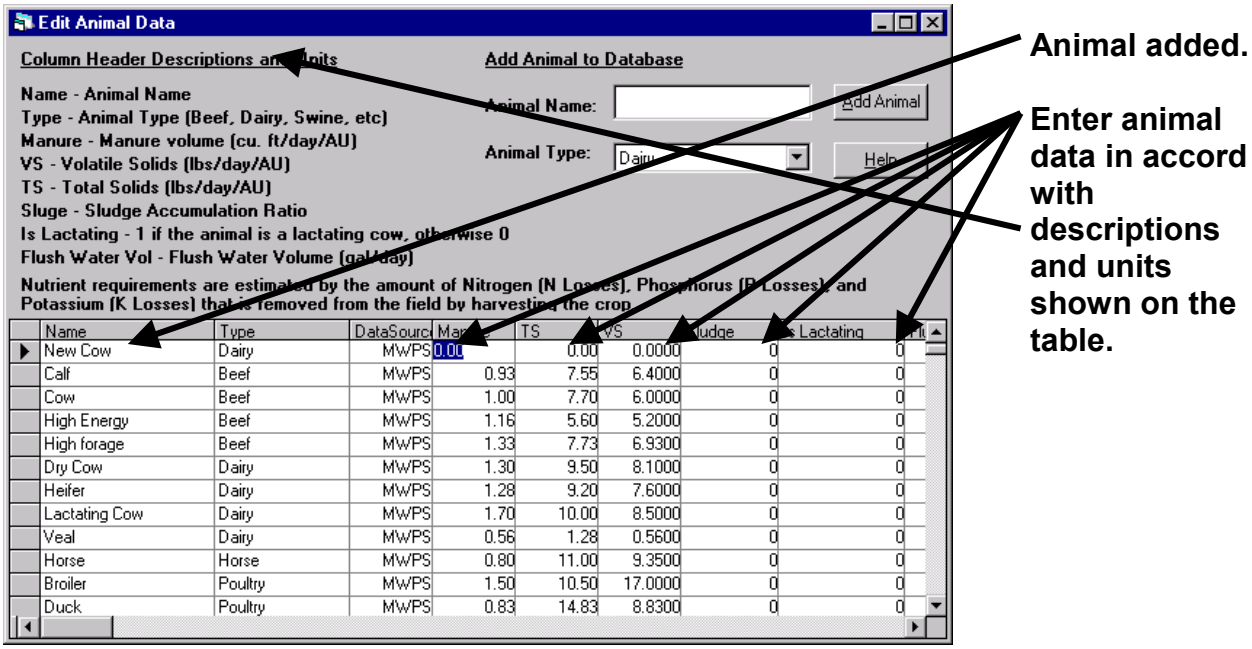


Enter the name of the animal to add.

Click here to access the drop-down list of animal types. Click on a animal type to select it.

Click on Add Animal **button to add the animal type selected to the data table.**

The added animal is placed on the first line in the data table. The following screen illustrates an animal named "New Cow" added using the procedure above. Animal data for the "New Cow" is added by clicking on the appropriate input cell and entering the data.



Animal added.

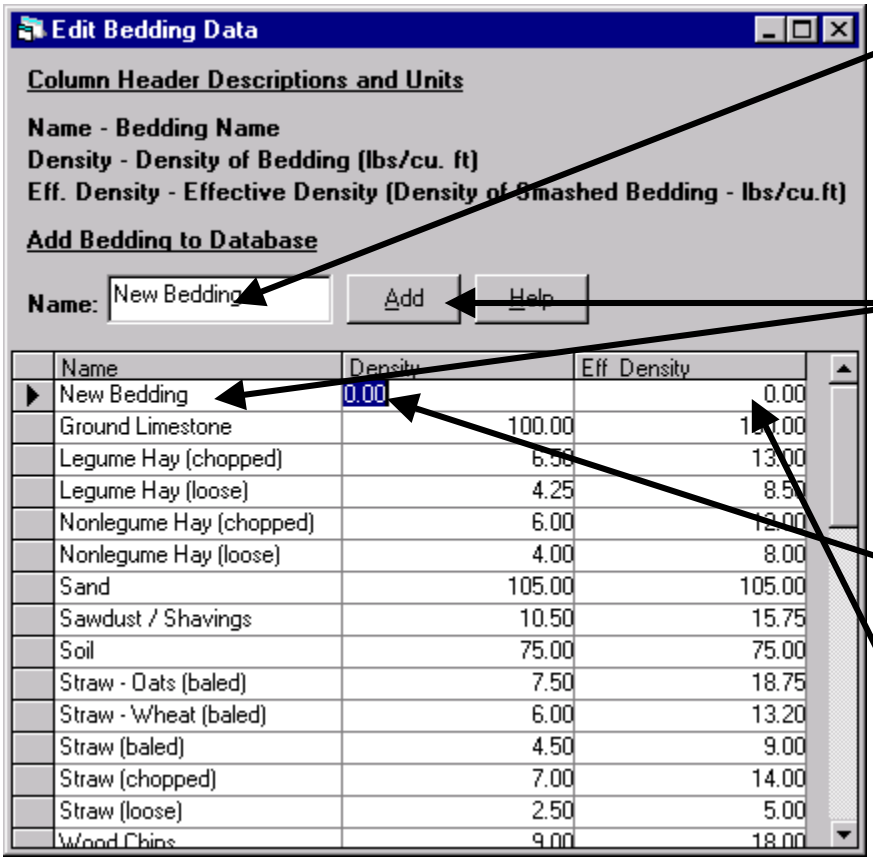
Enter animal data in accord with descriptions and units shown on the table.

After quitting and restarting the program, the new animal added with be sorted into an alphabetical order by Name and Data Source.

Animals added that are lactating are indicated with a one (1) in the "Is Lactating" column. This is to associate the animal with a flush water volume indicated in the "Flush Water Vol" column in the Flush Water Calculator on the Additions Screen.

Editing the Bedding Data

Editing the bedding data table is very similar to the editing the animal data table. Data may be edited within the data table or new bedding data can be added or existing bedding data deleted. The following screen illustrates how to add bedding data called "New Bedding":



Enter the name of the bedding data to be added. In this example "New Bedding" is being added.

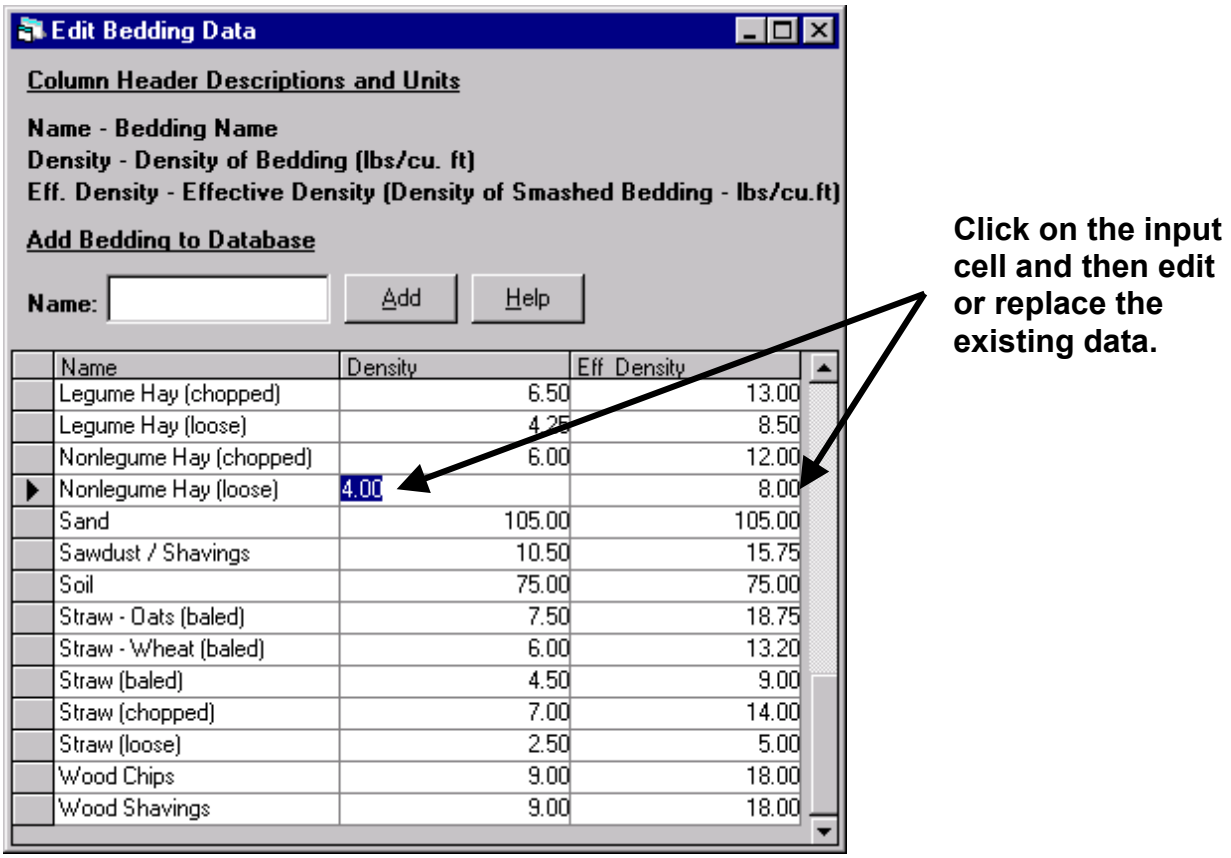
Click on 

button to add the "New Bedding" data. The "New Bedding" data appears on first line.

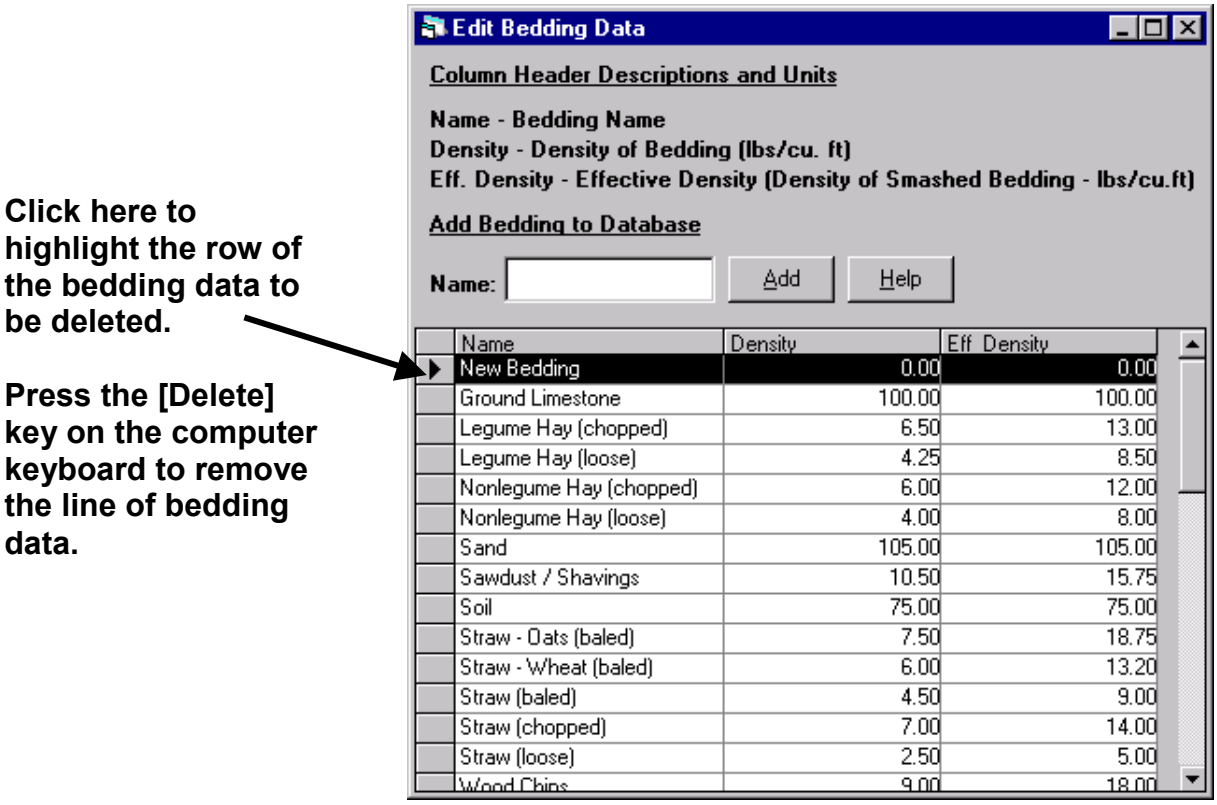
Enter the density in pounds per cubic foot of the "New Bedding".

Enter the effective density of the "New Bedding" in pounds per cubic foot.

The following screen illustrates how to edit existing bedding data:

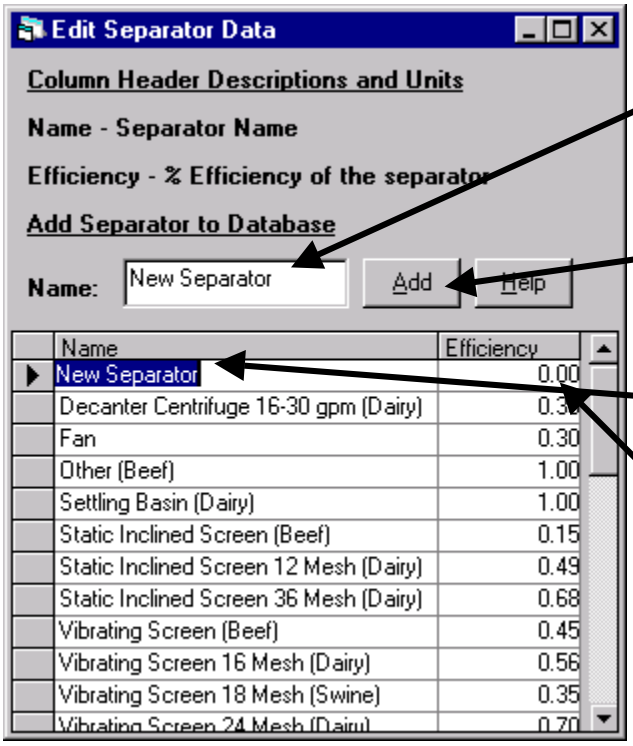


The following screen demonstrates deleting bedding material from the bedding data table:



Editing the Separator Data

The separator data table contains efficiency values for liquid/solid separators by the type of separator. Data may be edited within the data table, a new separator can be added, or an existing separator can be deleted. Adding a separator called "New Separator" is demonstrated on the following screen:



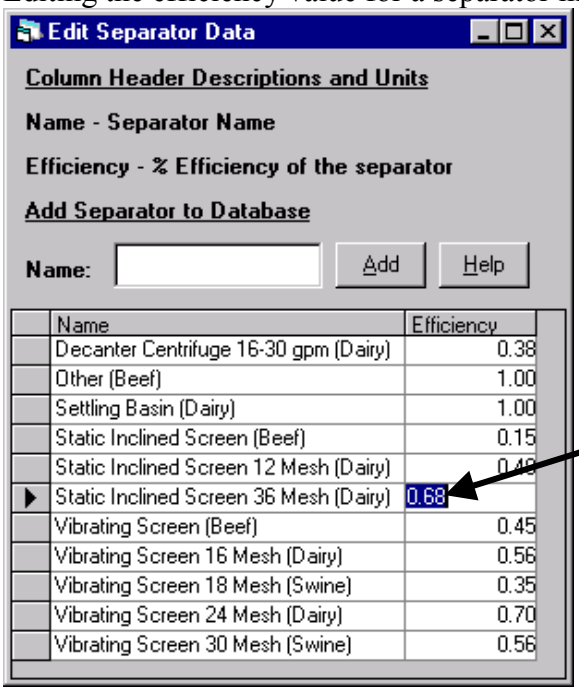
Enter the name of the separator to be added. In this example "New Separator" is being added.

Click on the Add button to add the "New Separator" to the data table.

The "New Separator" will be added to the data table and will appear on first line.

Enter the separator efficiency as a decimal for the "New Separator" added.

Editing the efficiency value for a separator in the data table is illustrated on the following screen:



Click on the input cell and then edit or replace the existing data.

Deleting a line of separator data is illustrated on the following screen:

Click here to highlight the row of the separator data to be deleted.

Press the [Delete] key on the computer keyboard to remove the line of separator data.